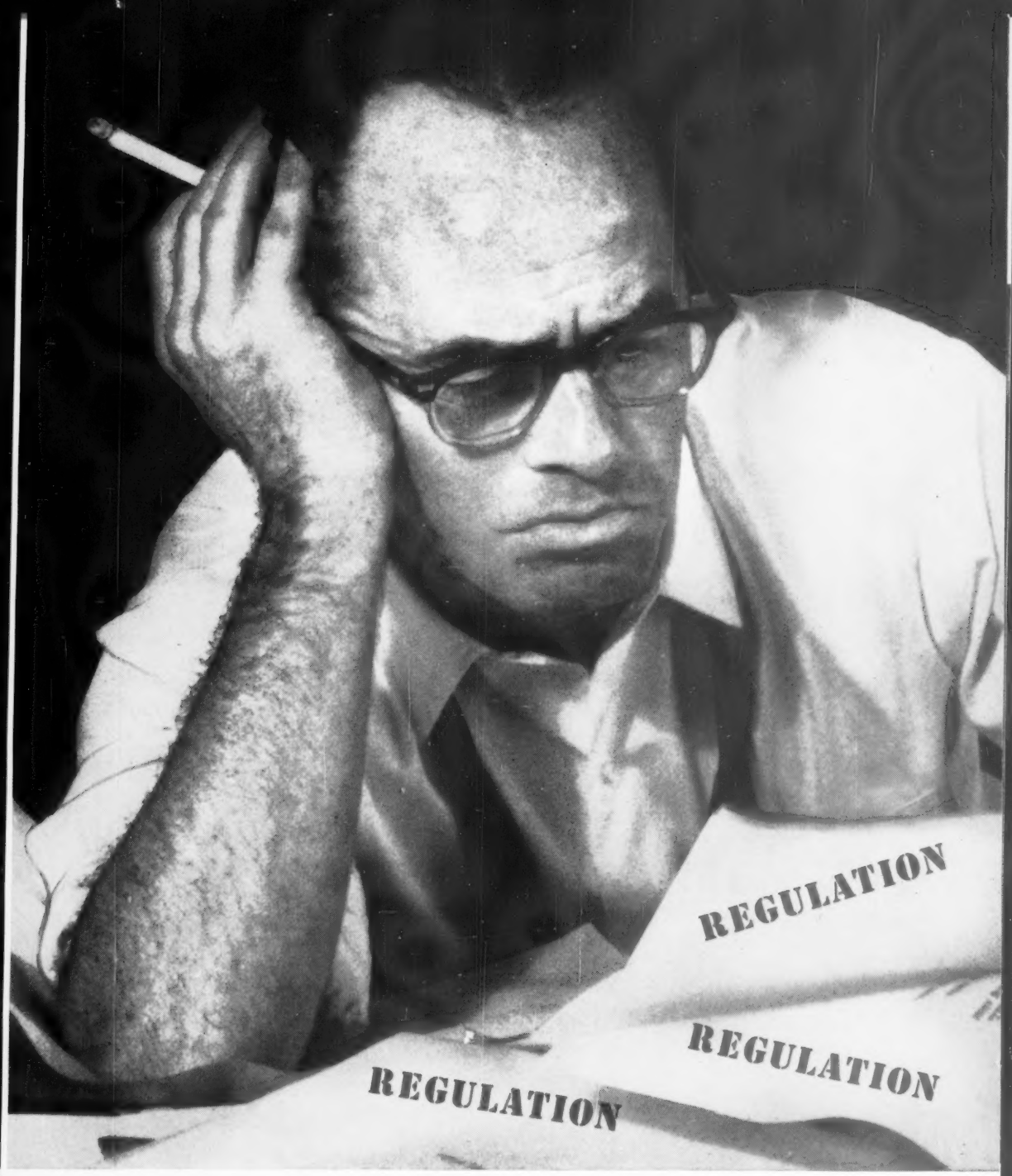
STEEL
The Metalworking Weekly
A PENTON PUBLICATION
MAY 22, 1961



PROGRAM FOR MANAGEMENT

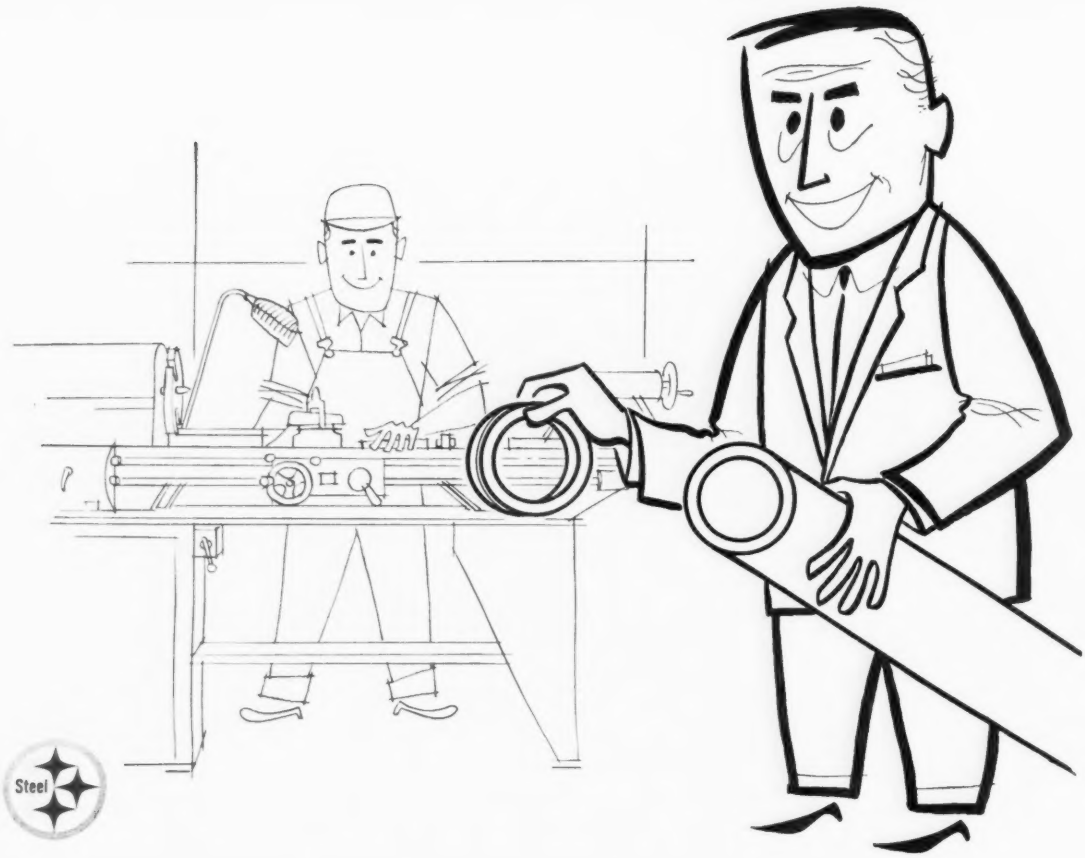
The Pressure from Government . . 83

Industry Speaks Up on JFK's Tax Plan . . 73

Planemakers Show How to Weld Foil . . . 116

New Superclean Steels Put on Market 157

METALWORKING WEEK—PAGE 17
COMPLETE CONTENTS—PAGE 19



YOU COME CLOSER TO FINISHED PRODUCT, REDUCE MACHINING TIME

when you specify B&W Job-Matched Mechanical Tubing

Do you consider tubing as a semi-finished product? It can be. In fact, when you start with the right B&W tube many end products require only finish machining—others need no machining at all.

Here's why. B&W seamless mechanical tubing is job-matched to your end-use application and production equipment. Desired finish, heat treatment, tolerances, alloy factor and steel quality are built into the tube to bring it as close as possible to the finished part. What's more, properties are uniform from tube to tube. You get fewer rejects —a more machinable tube in high-speed machining operations.

Interested? B&W mechanical tubing is available from Steel Service Centers around the country and through your B&W District Sales Office. Or write for Bulletin T-430. The Babcock & Wilcox Company, Tubular Products Division, Beaver Falls, Pennsylvania.

B&W

THE BABCOCK & WILCOX COMPANY

TUBULAR PRODUCTS DIVISION

TA-1011-M

Seamless and welded tubular products, solid extrusions, rolled rings, seamless welding fittings and forged steel flanges—in carbon, alloy and stainless steels and special metals

What else but sheet steel could build this new safety stepladder?

for Strength
... Economy
... Versatility

Steel

Stand on the platform, face in any direction, and you feel perfectly safe with this new Rid-Jid "Lifetime" Stepladder. What else but sheets of steel could build a ladder so strong and yet so light? Even the 7½-ft model weighs just 26 lb.

Made by The J. R. Clark Company, Spring Park, Minnesota, the ingenious Rid-Jid "Lifetime" ladder was designed almost entirely of sheet steel for the last word in safety, comfort, and convenience. Its special finish provides all-weather durability; rubber "shoes" give it sure footing even on slippery floors. Like other products in the Rid-Jid line, this ladder has the quality and the muscle that only sheets of *steel* can give.

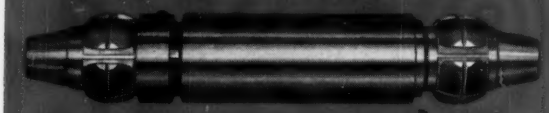
For many years Bethlehem has furnished blue-ribbon steel sheets to manufacturers of quality products, including The J. R. Clark Company. We can meet your needs with a wide range of sizes, grades, tempers, and surface finishes. Hot-rolled, cold-rolled, galvanized, galvannealed. And we'll gladly pitch in with metallurgical assistance. Just get in touch with our nearest sales office.

BETHLEHEM STEEL COMPANY, Bethlehem, Pa. *Export Sales:* Bethlehem Steel Export Corporation

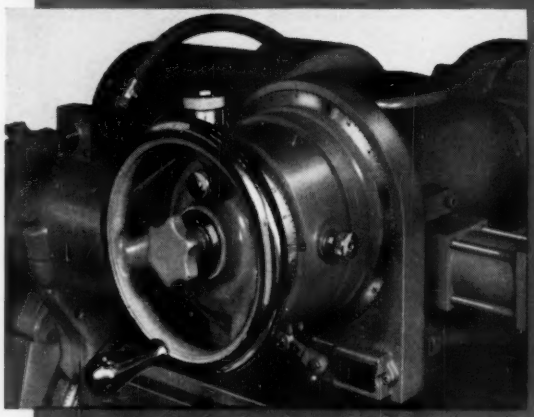
BETHLEHEM STEEL

BETHLEHEM STEEL

allNEW Landis Type R Universals will improve your grinding accuracy, speed setups

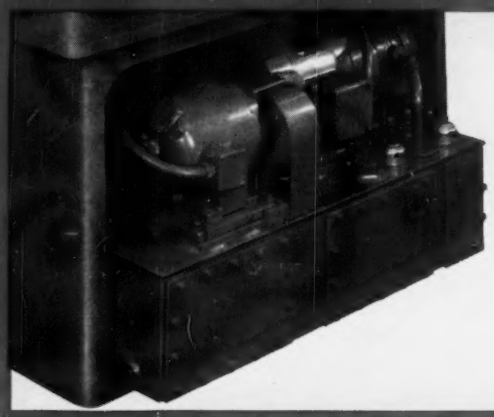


Exclusive Landis Microsphere wheel spindle bearings submerged in circulating and filtered oil. Large diameter spindle has constant and self-adjusting end thrust.



New hydraulic plunge feed available with turning handwheel to show rate and amount of feed during the grinding feed cycle.

New Landis 14" x 36" LR Universal Grinder



Improved machine alignment through better temperature control. Hydraulic oil tank, pump and motor are isolated from bed.

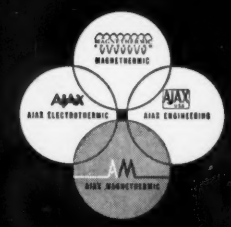
condensed specifications

	10" R	14" LR
max. work swing	10 31/32"	14 3/4"
length between centers	24"	36"-48"
std. grinding wheel	12" x 1"	14" x 1½"
work speeds, rpm (variable)	55 to 495	25 to 500
traverse speeds, rpm	2 to 240	2 to 240
wheel drive motor	2 hp	3 hp

LANDIS

world leader in precision grinders

LANDIS TOOL COMPANY, WAYNESBORO, PA.



CHIP MELTING—

Another economical application for induction melting.

WATCH AM

98% or more of the charge is converted to molten metal in AM Induction Melting furnaces. This high recovery rate, together with negligible alloy losses and simple temperature control, produces quality metal at a low cost from chips, borings, turnings and other scrap material.

Induction Heating is our ONLY Business

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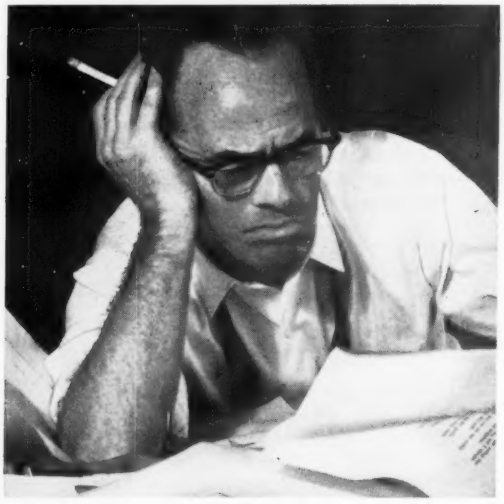
AJAX MAGNETHERMIC CANADA LTD. Box 779 • Ajax, Ontario

The newest combination in Induction Melting equipment — Steel Cage Coreless Furnace powered by a 300 KW Multiductor.

This 1850-pound forging will lose 80 pounds in the next 3 minutes. Finished, it will weigh 890 pounds and gage within .002″. To hog metal like this without loss of accuracy, Cann & Saul Steel Co. uses a new 36″ swing, 5-A Saddle Type Turret Lathe made by The Warner & Swasey Company, Cleveland.

W/S

The Pressure from Government



The gentleman you see there, harassed by government forms, directives, and regulations, is actually one of the happier men we know.

He's Art Bouhall of our art department, who was pressed into service to model for this cover and call attention to the tenth in our 25-part Plan for Profit Growth series (Page 83). Besides being a good model and artist, Art's a first-rate jazz musician.

As a player of the guitar and banjo, he performs frequently with an amateur group—doctors, dentists, architects, professors, and artists—who played professionally some years back and can't and don't want to get music out of their systems.

'Why Do Bees Hum?'

The conundrum was put to us by Geraldine, cleaning woman on this floor and night editor.

"Don't know," we grumbled. The question hit a sore spot because a hum usually develops in the right rear portion of our head when we're trying to get this column out. "Maybe, they're too busy to talk," we added, throwing out a hint.

"No," said Geraldine. "Bees hum because they don't know the words."

Come to think of it, stories may be just one long buzz if the editors don't know the words. One that we believe rises above a hum appears on Page 116. It's authored by Associate Editor Ross Whitehead and tells how missilemakers solved the problem of welding thin and curved pieces of metal.

Planning Session

We sat in on a prospectus meeting the other day. Once a month (on or about the 20th), Walt Campbell, John Morgan, Vance Bell, Bill Dean, Bob Huber, and Ed Case meet to co-ordinate planning for major news, market, and technical stories.

The meeting on May 19 was to expand and note any changes in plans for June and July and to come up with new ideas for August. At the meeting on June 20, we will put finishing touches on plans for July, expand the August proposals, and present new stories for September.

We always leave plenty of room for stories we can't plan (the news), but we plan as many as we can. It gives the editors the time needed to determine research and develop stories in depth.

You Write the Caption

Endevco Corp., Pasadena, Calif., maker of transducers for aircraft and missiles, is sending out a series of direct mail pieces entitled "Life in Space." One was this picture. Before you turn this page upside down and read Endevco's caption, try to write one yourself. We'd be interested in seeing it and will print some of the good ones.

"You'll never get ME up in one of those things."

STEEL, the metalworking weekly, is selectively distributed without charge to qualified management personnel with administrative, production, engineering, or purchasing functions in U. S. metalworking plants employing 20 or more. Those unable to qualify, or those wishing home delivered copies, may purchase copies at these rates: U. S. and possessions and Canada, $10 a year; all other countries, $30 a year; single copies, 50 cents. Metalworking Yearbook issue, $2. Published every Monday by The Penton Publishing Co., Penton Bldg., Cleveland 13, Ohio. Accepted as controlled circulation publication at Cleveland, Ohio.

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ONE OF THE NATION'S LARGEST AND MOST MODERN PRODUCTION FOUNDRIES

ESTABLISHED 1866

THE WHELAND COMPANY

CHATTANOOGA 2, TENN.

You spent $450,000,000 on bowling last year

13½ times as much as you gave to fight cancer

Shocking? Yes. And here's another shocking fact: in 1961, cancer will strike in approximately two out of three homes.

Go bowling. It's fun. Enjoy yourself. But when you spend fifty cents to knock down pins—give as much to the American Cancer Society—*to knock out cancer.*

If you do that, you will be giving $450,000,000 to fight cancer this year. *Thirteen and a half times as much as last year!*

Fight cancer with a checkup—and a check to the **American Cancer Society.**

STEEL The Metalworking Weekly

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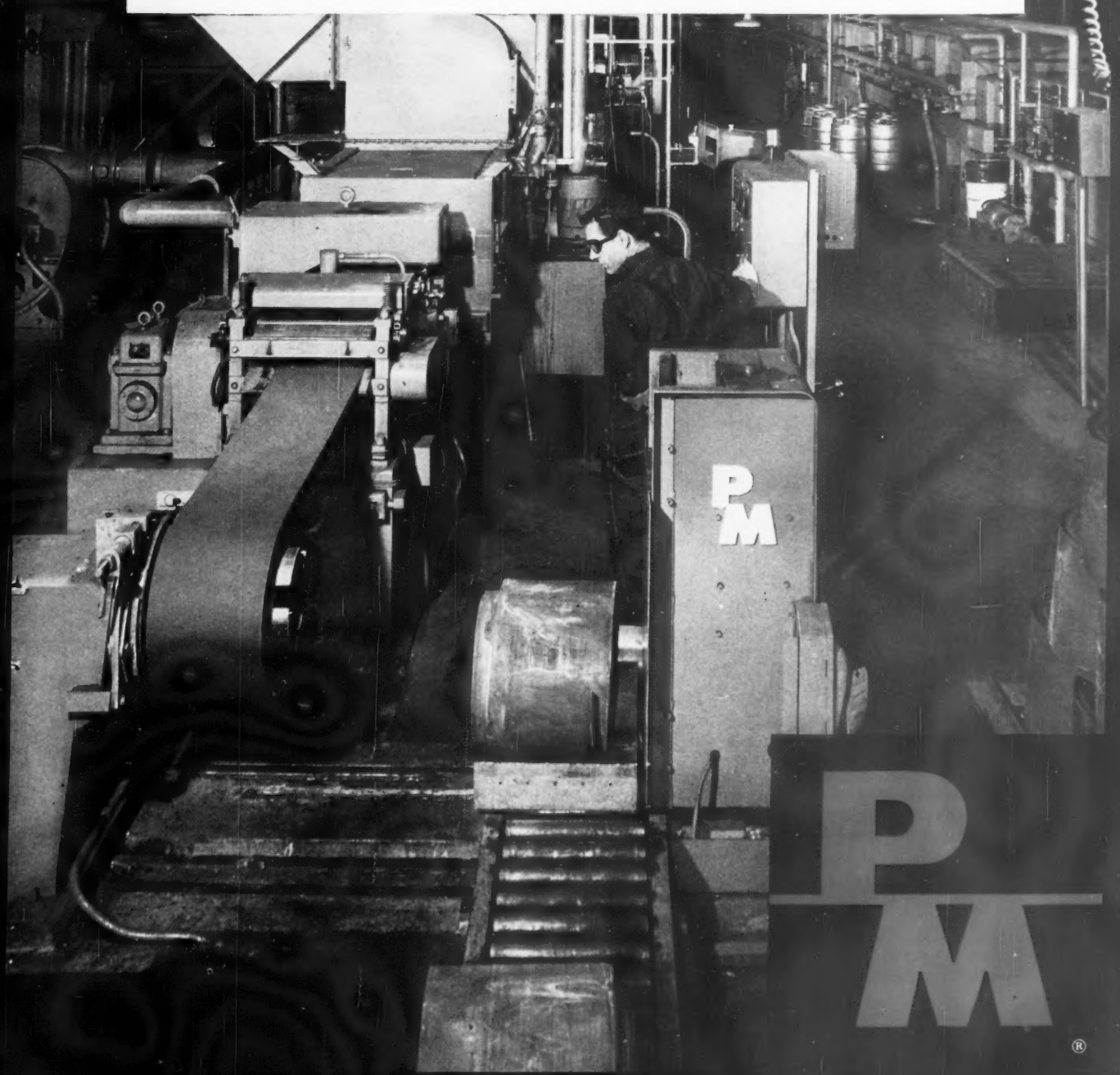
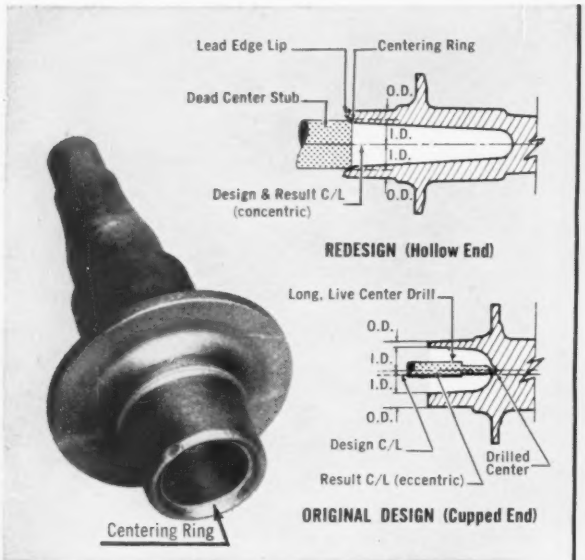


P M ®

Superior Parts at Lowered Cost with This Fresh Approach to Forging

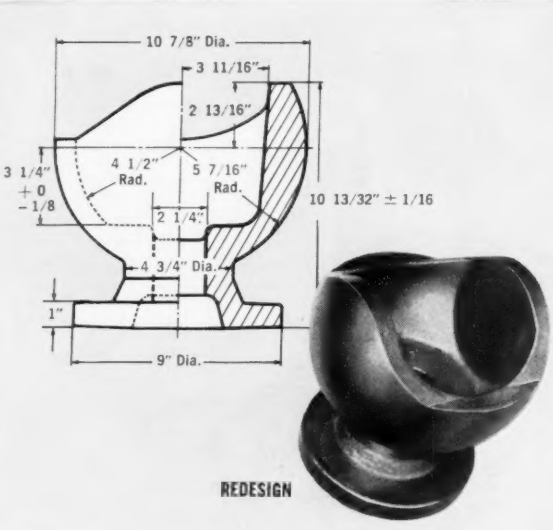
Many parts in use today are better as a result of design refinements suggested by COMMERCIAL's forging experts. Below are examples of COMMERCIAL upset forgings which demonstrate how these design refinements have resulted in superior parts for the OEM at lowered cost. These examples may appear to you as unusual in design—and this is the point...



Forging Redesign . . . Cuts Cost, Eliminates Tool Breakage, Cuts Scrap

Original design of axle spindle forging required chucking on the O. D. to enable center drilling of both ends. Part was held between drilled centers for overall machining. Concentric cupped axle end was center drilled blind with long, live center drill. O.D. and I.D. concentricity was difficult to maintain—causing eccentric drill centers. Result: tool breakage and machining scrap.

COMMERCIAL's redesign calls for a centering ring on inside edge of hollow end, forged without concentricity problem. Lead edge lip protects this important centering ring. The part can now be held for overall machining by a dead center stub engaged in the centering ring. Result: center drilling of open end not required, tool breakage eliminated, no machining rejects, metal savings.



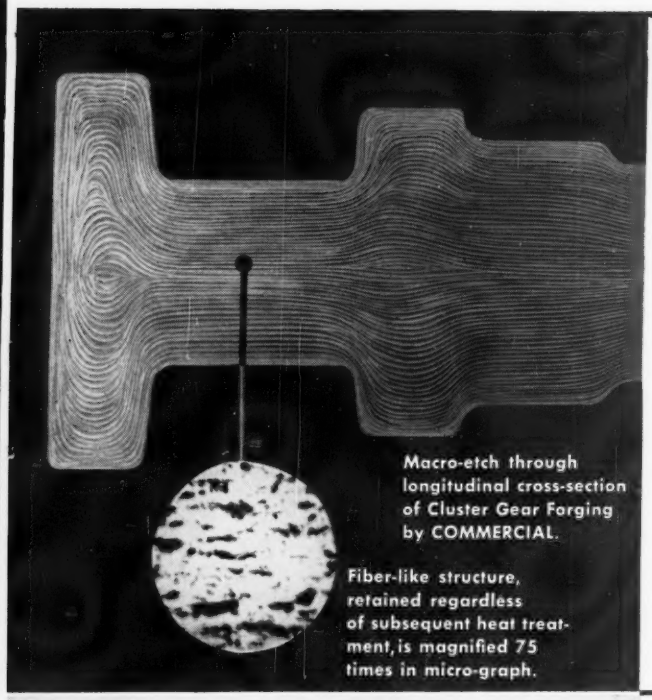
Unusual 80 lb. Forging . . . Reduces Cost, Replaces 95 lb. Casting

Ball joint housing for heavy duty steer and drive mechanism . . . formerly a steel casting. Field failures were traced to hidden metal faults. The housing was unable to withstand shock loadings encountered.

Problem: redesign for required strength—part to be no larger, no heavier, same shape.

Solution: an upset forging of unusual shape—flanged on one end, belled on the other, open at both ends. COMMERCIAL collaborated in the design and produced the part free of hidden metal flaws with sound, tough metal throughout—failures eliminated. Plus . . . weight saving over 15%, saving in machining cost 10%, greater strength-to-weight ratio.

When it's a vital part,



Macro-etch through longitudinal cross-section of Cluster Gear Forging by COMMERCIAL.

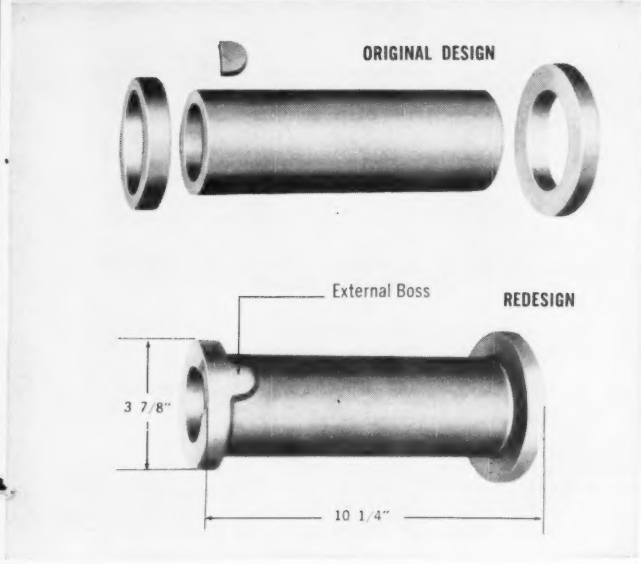
Fiber-like structure, retained regardless of subsequent heat treatment, is magnified 75 times in micro-graph.

Metal Quality Facts

Forgings start with "Forging Quality" rolled steel . . . steel that is closely controlled in its making for the purpose of eliminating defects and obtaining soundness—surface and interior. Such quality steels have been hot worked to obtain maximum development of their potential physical properties. Grain structure has been refined into a fibrous flow in the direction of working.

Mechanical hot forging of "Forging Quality" steel forces the metal in its plastic state to conform to specified shapes and achieves a vast improvement in its "as rolled" metal quality. Forging kneads the metal into a dense mass of strength and toughness and positions it into commercially exact dimensions and shape in all directions.

Upset Forging in closed dies produces by squeeze pressure a "looped" grain flow and permits concentration of grain density at points where the service stresses are calculated to be the greatest. Also, control of the directioning of the inherent fiber-like structure provides for maximum strength of the metal at required stress points. Not only are the properties of the metal improved in all directions but also the metal structure is refined and compressed resulting in a structural uniformity that renders the metal remarkably free from concealed defects.



One Piece Forging . . . Lowers Cost, Eliminates Four Piece Weldment

Blank for hydraulic cylinder outer barrel used to position Nike missile...originally a weldment—a tube, two flanges and a boss.

Problem: cut unit production time to meet crash program schedule, reduce assembly and machining cycle, increase strength-to-weight ratio.

Solution: a difficult upset forging because of external boss. COMMERCIAL tooled and produced the part in one piece to print. Assembly time eliminated, less distortion . . . improved machining conditions, forged to closer tolerances, uniform metal quality, added tensile and torsional strength due to controlled grain flow, strength-to-weight ratio increased, delivery schedule satisfied.

better make it FORGED

Advantages of Upset Forgings

- *Uniform strength, toughness and high fatigue resistance insure longer, more dependable service life for equipment.*
- *Parts made closer to finished dimensions—cuts scrap, reduces machining and finishing time.*
- *Components can be assembled by simple production methods into complex parts.*
- *Uniform response to heat treatment gives desired physical properties of precise degree.*
- *Higher strength-to-weight ratio obtainable—a vital factor in the design complexity of parts for the future.*

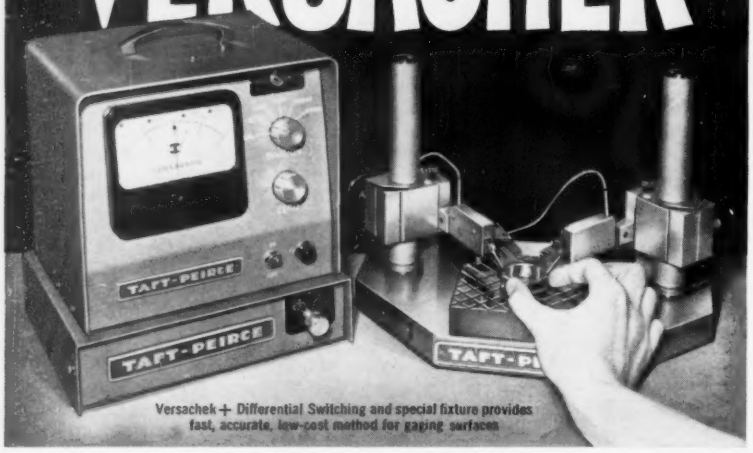
Features of Upset Forging by COMMERCIAL

- *Batteries of upsetters from 1½" to 8"—custom or production runs.*
- *Hydra-Jet descaling prior to forging reduces imbedded surface scale.*
- *Magnetic particle depth inspection to detect metal faults before shipment.*
- *"Task Forging" team steeped with experience in producing the unusual upset forging.*

While designs are on the board, call on COMMERCIAL'S "Task Forging" team to collaborate with you—send print or sketch, sample or prototype. Address: Commercial Shearing & Stamping Co., Dept. **L-21**, Youngstown 1, Ohio.

COMMERCIAL
shearing & stamping

VERSACHEK



Versachek + Differential Switching and special fixture provides fast, accurate, low-cost method for gaging surfaces

New Concept in Gaging and Control!

Versachek and Height Gage, a standard gaging package

Classifier Unit for Rapid Sorting and Inspection

Multi-Stage Classifiers sort by size ranges, plus over and under

Multiple Switching for Rapid Gaging of Different Points

Every manufacturer can now reap the benefits of high magnification, close tolerance, visual gaging with utmost accuracy and reliability, plus ease and simplicity of operation.

Versachek combines rugged electronic circuitry and experienced gagemaker's craftsmanship to provide a unique combination of features . . .

- Tolerances within millionths, read at a glance.
- Built-in calibration.
- Common zero for all magnifications from 400:1 to 20,000:1, or more.
- Modular design for easy interchange of units without special skills.
- Power output for operating digital recorders, printers and auxiliary equipment.

Above all, Versachek is versatile, using off-the-shelf, modular components. In addition to Height Gage and Comparator Stand, you can use Versachek with Capsules to build custom fixtures and in-process gaging systems, and add the modular units — multiple switchers, classifiers, digital voltmeters — to create either simple or sophisticated control, sorting and feedback systems.

Find out about the many ways Versachek can Pay Off for you! Send for the comprehensive Versachek Catalog with specification and application data. Ask for No. 614.

TP1-1

TAFT-PEIRCE *GAGING*

TAFT-PEIRCE MANUFACTURING CO.
25 MECHANIC AVENUE, WOONSOCKET, RHODE ISLAND

CALENDAR OF MEETINGS

May 24-25, American Iron & Steel Institute: Annual meeting, Waldorf-Astoria Hotel, New York. Institute's address: 150 E. 42nd St., New York 17, N. Y. Secretary: George S. Rose.

June 4-7, American Gear Manufacturers Association: Annual meeting, The Homestead, Hot Springs, Va. Association's address: 1 Thomas Circle N.W., Washington 5, D. C. Executive director: J. C. Sears.

June 4-7, National Association of Purchasing Agents: Annual meeting and exhibit, Conrad Hilton Hotel, Chicago. Association's address: 11 Park Place, New York 7, N. Y. Executive secretary: G. W. H. Ahl.

June 8-9, Malleable Founders Society: Annual meeting, The Broadmoor, Colorado Springs, Colo. Society's address: 781 Union Commerce Bldg., Cleveland 14, Ohio. Executive vice president: Lowell D. Ryan.

June 11-15, American Society of Mechanical Engineers: Semiannual meeting, Statler Hilton Hotel, Los Angeles. Society's address: 29 W. 39th St., New York 18, N. Y. Secretary: O. B. Schier.

June 14-17, Drop Forging Association: Annual meeting, The Greenbrier, White Sulphur Springs, W. Va. Association's address: 55 Public Square, Cleveland 13, Ohio. Executive vice president: Dwight M. Allgood.

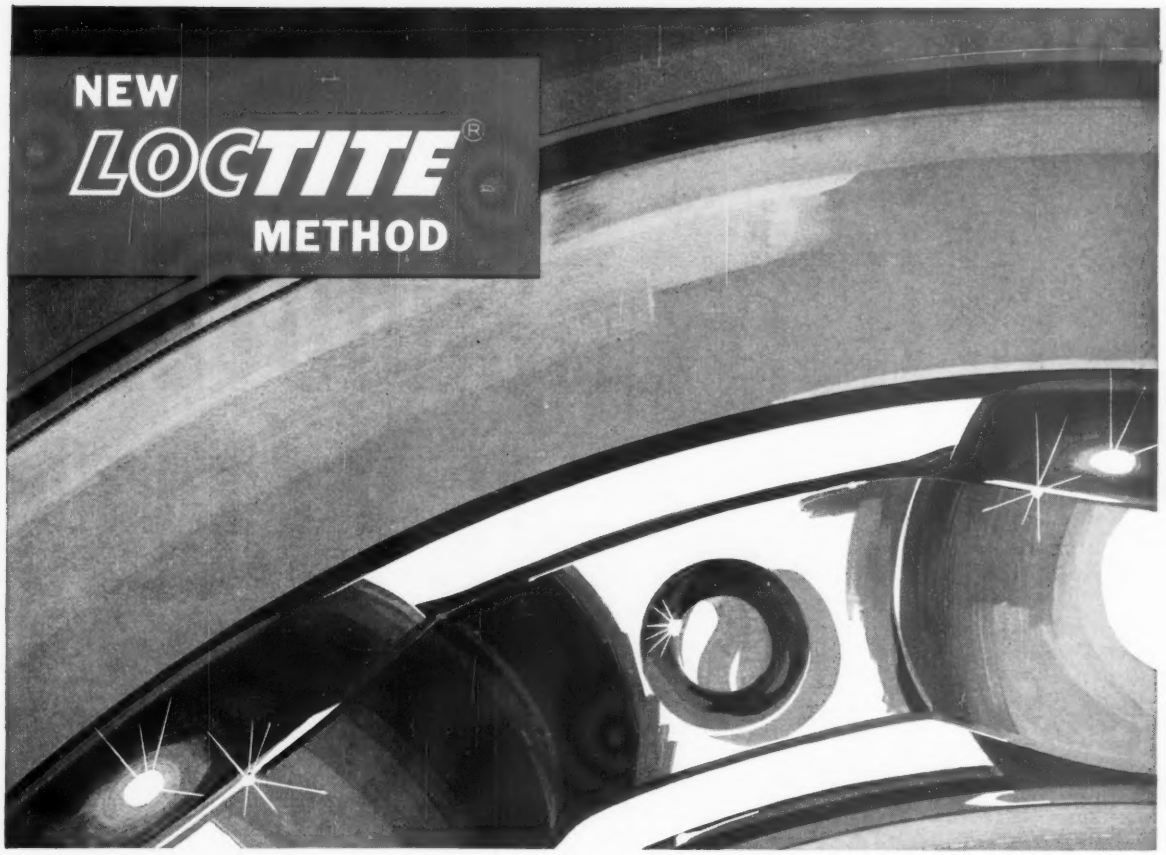
June 15, National Association of Secondary Material Industries Inc.: Midwestern meeting, Statler Hilton Hotel, Cleveland. Association's address: 271 Madison Ave., New York 16, N. Y. Administrator: M. J. Mighdoll.

June 18-20, Alloy Casting Institute: Annual meeting, The Homestead, Hot Springs, Va. Institute's address: 1001 Franklin Ave., Garden City, N. Y. Executive vice president: E. A. Schoefer.

June 18-23, American Electroplaters Society: Annual convention, Statler Hilton Hotel, Boston. Society's address: 445 Broad St., Newark 2, N. J. Executive secretary: John P. Nichols.

June 19-21, American Marketing Association: Meeting and exhibit, Ambassador Hotel, Los Angeles. Association's address: 27 E. Monroe St., Chicago 3, Ill. Executive director: Vance E. Lockhart.

June 19-21, Material Handling Institute: Great Lakes Show, Cobo Hall, Detroit. Information: Shea Expositions Corp., 1 Gateway Center, Pittsburgh 22, Pa. President: L. West Shea.



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. . . without A Penny Invested in Equipment!

Simply apply a few drops of LOCTITE Sealant to press fit assemblies. Look at these production assembly advantages:

- Greatly increases reliability of interference fits and other methods of metal-to-metal assembly.
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- Reduces materials costs—minimizes design requirements.
- Facilitates assembly of delicate parts—reduces danger of deformation.
- Facilitates proper concentric fit of mated parts in line-to-line fits—this liquid-turned-to-solid mates parts better than any metal-to-metal contact possible.

. . . and parts can be disassembled with standard tools and techniques.

WHAT IS LOCTITE? LOCTITE Sealant is a penetrating liquid resin with low viscosity that hardens when confined between closely fitted metal surfaces. It "wicks in" between the most closely mated of matched precision surfaces and hardens into a strong, heat-, oil-, grease-, solvent- and vibration-resistant bond. LOCTITE completely fills the space between the surfaces . . . adds its sheer strength to that of the press fit. There are no solvents to evaporate —no catalyst to mix.

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Consolidated Diesel Electric Corp.	Remington Rand Univac
The Maytag Company	Philco Corp.—Government & Industrial Div.
Westinghouse Electric Corp.	General Electric Company
General Dynamics Corporation, Electric Boat Division	Raytheon Mfg. Co.
Reeves Instrument Corporation	McDonnell Aircraft Corporation

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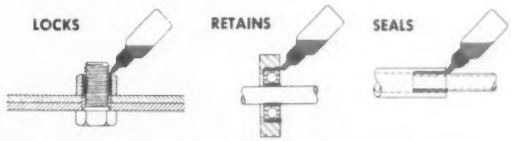

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EXCLUSIVE! GOODYEAR GREEN SEAL V-BELTS

to give you sets that are precision-matched in length to outperform...and outlast...all others

At no extra cost, GREEN SEAL *V-Belts also give you:*

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The most complete line of V-Belts in the industry—easily and quickly available through our nationwide network of distributors.

Still another "plus": The G.T.M.—Goodyear Technical Man—is available to help you select the right belts for any drive.

For your best buy in multiple drive belts—including new money- and space-saving HY-T Wedge V-Belts—look to Goodyear. Also, get the full story on P.D. (positive drive) Belts and Variable Speed Belts from your Goodyear Distributor. Or write Goodyear, Industrial Products Division, Akron 16, Ohio.

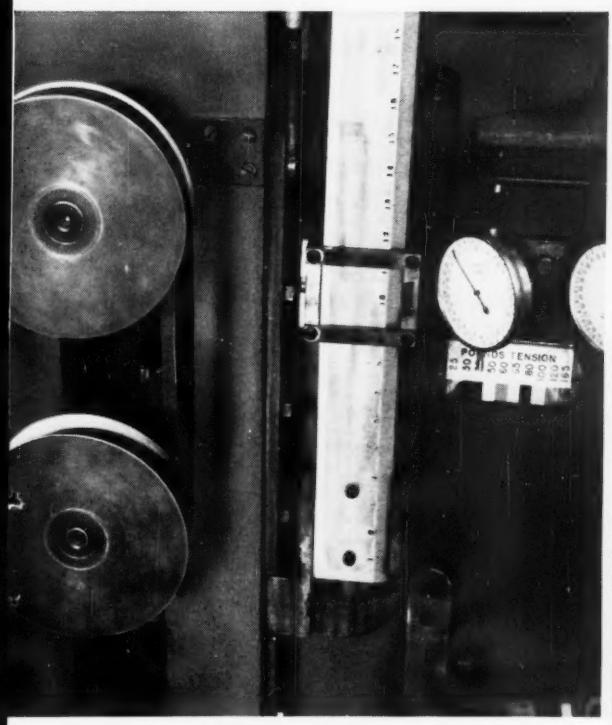
Lots of good things come from

GOODYEAR

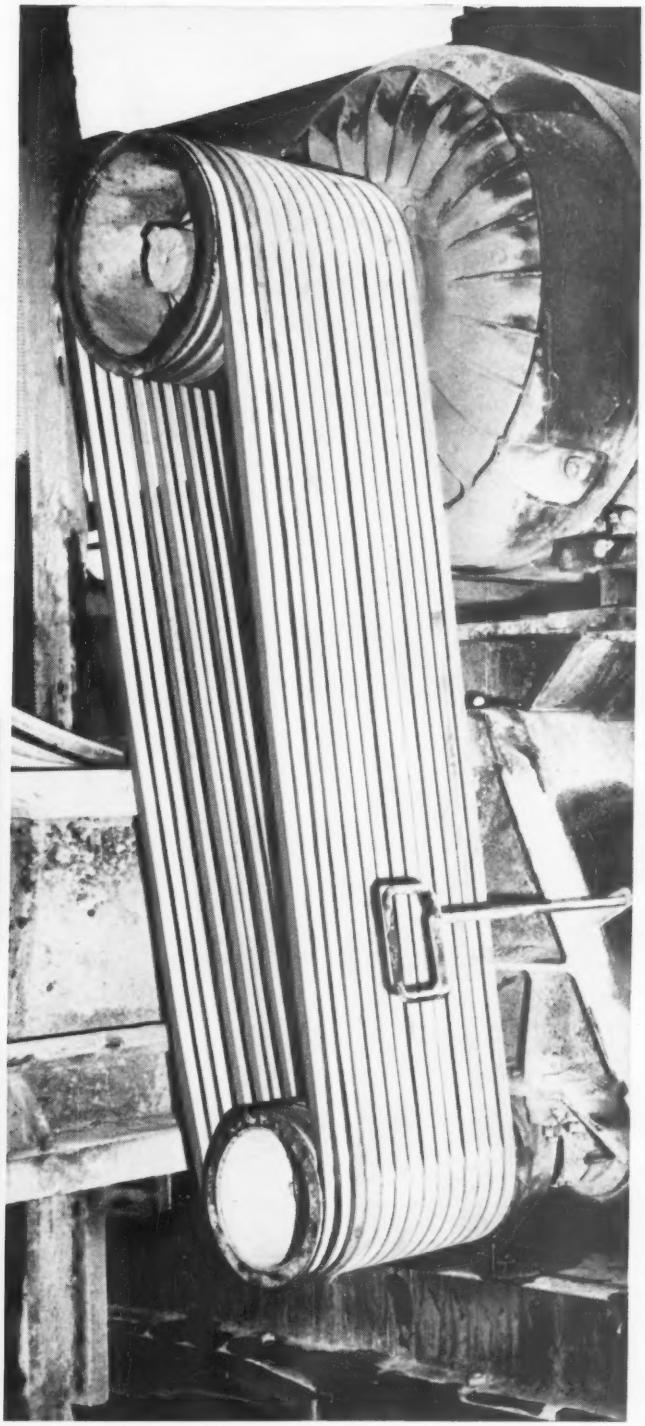
INDUSTRIAL PRODUCTS

Compass, Green Seal, Hy-T, P.D.—T.M.'s
The Goodyear Tire & Rubber Company, Akron, Ohio

CODES TO 1/32"...



Length-coding GREEN SEAL V-Belts to 1/32"—not just 1/10" like most belts—takes this ultra-precision machine. *Only* Goodyear has this type of equipment, which is set by means of fine-tolerance steel templates to insure accuracy.



Harnessing this big, 22-saw stonecutter for 3 full years required COMPASS-V-Steel Belts by Goodyear. Over this period, the Goodyear belts helped carve up 20 tons of rock a day—over 15,000 tons in all. Normal V-belt life in this type of rugged service is a scant 6 months.

REPUBLIC PH

REPUBLIC 17-7 PH* and PH 15-7 Mo*

These grades possess the cold formability of austenitic stainless grades . . . the hardenability of martensitic grades. High strength levels and good creep resistance are maintained at temperatures to over 700°F. and 900°F. respectively. *Typical applications:* aircraft and advanced missile structural parts, bellows, hose clamps, leaf springs and spring clips, pressure tanks, surgical instruments, antennae.

STAINLESS STEELS

BECAUSE THEY OFFER GREATER VERSATILITY, precipitation hardenable stainless steels broaden the already wide field of stainless steel applicability . . . Republic PH Stainless Steels available in the standard mill products effectively reduce fabricating costs. Higher developed strengths —*which remain high at elevated temperatures*—are coupled with the formability and corrosion-resistance of other stainless grades. Mail coupon for data.

REPUBLIC 17-4 PH*

Simple heat treatment after fabrication develops high strength levels without excessive distortion or scaling. Unlike most martensitic chromium types, Republic 17-4 PH* is welded without preheating or post annealing, thus resulting in lower fabricating costs. *Typical applications:* bearings, bolts, shafts, aircraft fittings, gears, splines, mandrels, pins, seats, and valves.

REPUBLIC A-286

In addition to excellent corrosion-resistance, this grade is designed to afford elevated temperature creep and stress rupture strength to over 1200°F. Because it is used on critical applications, majority of tonnage produced is processed from ingots that have been vacuum melted by Republic's consumable electrode process. *Typical applications:* jet engine and gas turbine components such as wheels, blades, frames, housings, afterburners, tail cone parts, and fasteners.

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At Seaway Steel, every order, regardless of size, gets the same special attention, personal and accommodative service.

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Republic's Patton Sees Order Uptrend

"Steel output should rise during each quarter of 1961 and the first half of 1962," T. F. Patton, president, Republic Steel Corp., told a National Industrial Conference Board meeting. He put 1961 ingot output at "close to 100 million tons" and added: "The outlook for the first half of 1962 is even better—when the weekly ingot rate should approach 2.4 million tons." He predicted that "the 12 months—July, 1961, through June, 1962—may see total ingot production coming close to the record calendar year of 1955."

S-P's Egbert Pinpoints Auto Sales Uptrend

"From an annual domestic sales rate in the first quarter of around 5.6 million units (including imports), we can reasonably expect the industry's sales to rise to a 6 million annual sales pace by September, going on to reach a 6.4 million to 6.8 million annual rate for the fourth quarter." That's what Sherwood H. Egbert, president, Studebaker-Packard Corp., told the National Industrial Conference Board meeting. He noted that the replacement market is now 1 million units bigger than in 1958. It totals about 4.5 million units.

A-C's Stevenson Predicts Capital Spending Gains

Manufacturers of electrical equipment can count on selling about 5 per cent more (dollar volume) this year than last, R. S. Stevenson, president, Allis-Chalmers Mfg. Co., told the National Industrial Conference Board meeting. "Capital equipment purchases are likely to be slightly ahead of last year," he predicted. He said utilities would buy less generating equipment this year, slightly more distribution equipment, and considerably more transmission equipment. "Farm equipment sales will continue their modest but steady advance," he said.

Republic Plans Automated Facility

Republic Steel Corp., "with a major supplier of automatic equipment," is studying the feasibility of tying together order processing, mill scheduling, production control, record keeping and analysis—into a unified, automatic system under computer control. Place: The Warren, Ohio, mill.

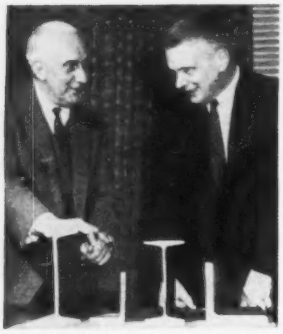
Outlook for Construction

"The current outlook (for the construction industry) is not particularly encouraging and does not indicate any sharp uptrend in volume for the near future," says H. C. Turner Jr., president, Turner Construction Co. . . .

Technical Outlook—Page 115 Market Outlook—Page 155

Norman Robertson, manager-economic studies, American Radiator & Standard Sanitary Corp., foresees a sustainable volume of nonfarm housing starts (around 1.3 million units a year) until 1966, when the rate is likely to increase.

U. S. Steel Markets Quenched, Tempered Alloy Structurals



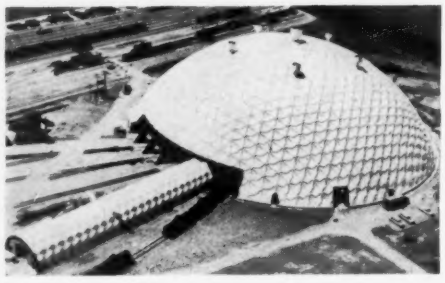
Rolled channels, I-beams, and angles made of quenched and tempered alloy steel are available from U. S. Steel Corp. Frank T. Bumbaugh, manager of alloy products sales (left), and Marcus M. Chapman, administrative vice president-commercial, are examining samples of the new standard shapes which are said to provide weight and cost savings in a wide variety of structural applications. The shapes are heat treated to design strengths as much as three times those of structural carbon steel. See Page 79

Goldberg Moves to Halt Missile Delays

Labor Secretary Goldberg has promised "prompt" action to solve the union problems that have delayed and inflated the cost of the nation's missile defense program. He did not say definitely that he would seek a no-strike pledge from the unions but noted it was "obvious" that the administration was seeking uninterrupted missile production. His proposal is expected to include the establishment of an agency to which unions can bring their grievances rather than strike. The types of abuses revealed by the McClellan investigating subcommittee, which prompted the White House action, included: 1. Strikes and work stoppages at 22 bases have cost 162,872 man-days of work since 1956. 2. Union rules have required workers at two bases to take apart factory assembled equipment and put it back together again. 3. Skyrocketing overtime pay (partially due to union featherbedding) resulted in plumbers and pipefitters drawing $420 to $733 weekly, elevator operators getting as much as $360 weekly, and ditch diggers being paid up to $287 a week. The ditch diggers were paid far better than the astronauts.

Circular Plant Provides Efficient Layout

The absence of internal supports in Union Tank Car Co.'s Wood River, Ill., repair plant permits unimpeded work flow over the 2½ acres it covers. The all-steel geodesic dome was built from the top down—raised by a huge nylon balloon.



9000 Firms Had Hand in Space Shot

Around 9000 companies had a part in sending Alan Shepard into space. The two prime contractors were McDonnell Aircraft Co. (for the Mercury

capsule) and Western Electric Co. (for electronic tracking and guidance). McDonnell estimates that 4000 firms participated in making the capsule (see STEEL, May 15, p. 21). Western Electric says about 5000 firms were involved in its project. McDonnell's principal subcontractors included Minneapolis-Honeywell Regulator Co., Perkin-Elmer Corp., Collins Radio Co., Grand Central Rocket Systems Co., Cincinnati Testing Co., and Thiokol Chemical Corp. Western Electric's main subcontractors were Burns & Roe Inc., International Business Machines Corp., and Bendix Corp.

RCA Shows Portable Color TV

Not a compact of the nose powdering type, but a supercompact color TV receiver is the gadget in this lady's hands. It's one of eight projected "sets of the '70s" foreseen by Radio Corp. of America's Advanced Design Center. The battery powered, pocketbook size, unit is a combination, clock operated, color TV and stereo radio receiver.

Industry Asks Government to Share Foreign Risks

U. S. business does not ask for guarantees against normal business risks, but it cannot cope with political risks, Stanley de J. Osborne, president of Olin, New York, told the Subcommittee on Africa of the House Committee on Foreign Affairs. Mr. Osborne and representatives of other firms with interests in Africa suggested that government strengthen its investment guarantee program, increase funds with which industry can make loans, and promote a better world-wide investment climate.

Steel Imports and Exports Rise

Imports of steel mill products in March hit the highest point since May, 1960, while exports rose to the best level since November, 1960, the Commerce Department reports. Imports totaled 211,000 tons—up 59,000 from February. Exports totaled 168,000 tons—up 21,000 from February. For the first quarter, imports total 508,000 tons, exceeding exports by 61,000 tons.

Rise in Pneumatic and Hydraulic Equipment Sales Forecast

Sales of pneumatic and hydraulic systems and devices will reach $560 million in '61 and $700 million by 1966, predicts William C. Richards Jr., executive vice president of Bellows-Valvair Div. of International Basic Economy Corp., Akron. He was elected president of the National Fluid Power Association last week, succeeding Frank Flick, president, Flick-Reedy Corp., Bensenville, Ill. Uniform standards for the industry will be discussed at an international meeting, London, England, Apr. 30-May 4, 1962.

Look What Electronics Will Do

"We have only scratched the surface of the applications for electronics," asserts Dr. George Haller, vice president, General Electric Co. He lists

STEEL The Metalworking Weekly

May 22, 1961 Vol. 148 No. 21

CONTENTS

THE EDITOR'S VIEWS:
Tax Credit: More Calories Needed ..69

WINDOWS OF WASHINGTON:
President Hints at Trade Policies ..80

MIRRORS OF MOTORDOM:
GM Readies Compact Ragtops 89

THE BUSINESS TREND:
Autos Strong Factor in Upswing ..93

NEWS SECTION:
Industry Speaks Up on JFK Tax Plan 73
Copper Mills Aim at Auto Markets .75
Service Center Sales Climb 75
EDP Centers Fill the Gap 76
Alloy Shape Output Speeded 79
Program for Management—The Pressure from Government 83
Steelmakers Intensify R&D Work .103

TECHNICAL SECTION:
Technical Outlook 115
How to Weld Thin, Curved Pieces .116
Rubber-Metal Bonding Simplified .118
Fibrous Alumina Has Varied Uses .119
Pump Moves Metal Powder 120
Hot Dies Speed Titanium Forming 121
Radiation Control Gets Attention ..122
Progress in Steelmaking—Oxygen Practice Gets Boost 124
Sixth Stand Speeds Thinner Strip .126
Tips on Selecting Epoxy Tools 128
Adhesive Joints Given Shear Test 133
Extrusion Press Ups Tubing Output 134
Lower Alloy Better for Some Jobs 135

MARKET SECTION:
Market Outlook 155
Complete Index to News and Prices 155
Crucible Adds to Superclean Steels 157
District Ingot Rates and Chart ...164
Ingot Output at 11 Month High ..164
Scrap Price Composite Is Steady .177
Nonferrous Metal—Copper Price Could Rise Further 180

DEPARTMENTS & INFORMATION:
Servicenter 5
Editorial and Business Staffs 6
Calendar of Meetings 10
Metalworking Week 17
Metalworking Pulse 20
Men of Industry 97
New Products 137
New Literature 151
Advertising Index 184

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these "near future" applications: 1. Devices that will monitor and regulate body functions (such as GE's "Pacemaker" that controls the heart beat). 2. TV adaptations for remote control medical diagnosis. 3. Educational devices. 4. Sensors and controls to automatically monitor and regulate industrial production "far beyond that believed possible only a few years ago."

How We Spent Our Money Last Year

An analysis of federal tax collections by Commerce Clearing House, Chicago, finds that: We smoked, drank, bet, watched TV, and traveled more in 1960 than ever before; we bought more musical instruments but fewer minks; we took photographs like mad; we dolled ourselves up more (taxes on toilet preparations rose) but maybe had nowhere to go (cabaret and admission taxes were off).

Automatic Vending Headed for $6 Billion Volume

Automatic vending, an industry that began in Greece with the invention of a machine to dispense holy water at the drop of a drachma, will have annual gross sales in excess of $6 billion before 1970, industry leaders estimate. From 1946 to 1959, vended merchandise sales rose 296 per cent. Last year's sales hit a record $2.59 billion. About 4 million machines, made by 150 firms, are operating. Factory shipments in '60 reached $165 million.

Straws in the Wind

Melpar Inc. says it has developed a maser spectrometer that "increases a thousandfold the ability to observe chemical reactions involving free electrons—including those in human cells" . . . U. S. Steel Corp. has announced the availability of "USS Fremax 45," a new, strong, free machining, steel plate . . . April's new housing starts were at a seasonally adjusted annual rate of 1,233,000 units, down 6 per cent from the March pace and 7 per cent from that of April, 1960 . . . Exports of precision instruments reached a record $337 million in 1960—up 22 per cent from 1959 . . . More than 2.3 million workers are scheduled for deferred wage increases in 1961 based on contracts concluded in prior years, reports the National Industrial Conference Board. The most frequent increase will be 7 to 9 cents an hour vs. 5 to 7 cents in 1960 . . . The Commerce Department reports that seasonally adjusted orders for durable goods in April increased 4 per cent to $14.5 billion.

Metalworking Pulse

The Business Trend: The Federal Reserve Board index jumped 2.5 per cent in April, due mainly to increased auto output, which in turn helped boost steel production. **Autos:** Makers expect to turn out more than 500,000 units in May and an equal number in June. Sales are projected at about the same rate, which would keep inventories near 900,000 through July. **Steel:** Output is at the highest level since a year ago. Look for continued improvement.

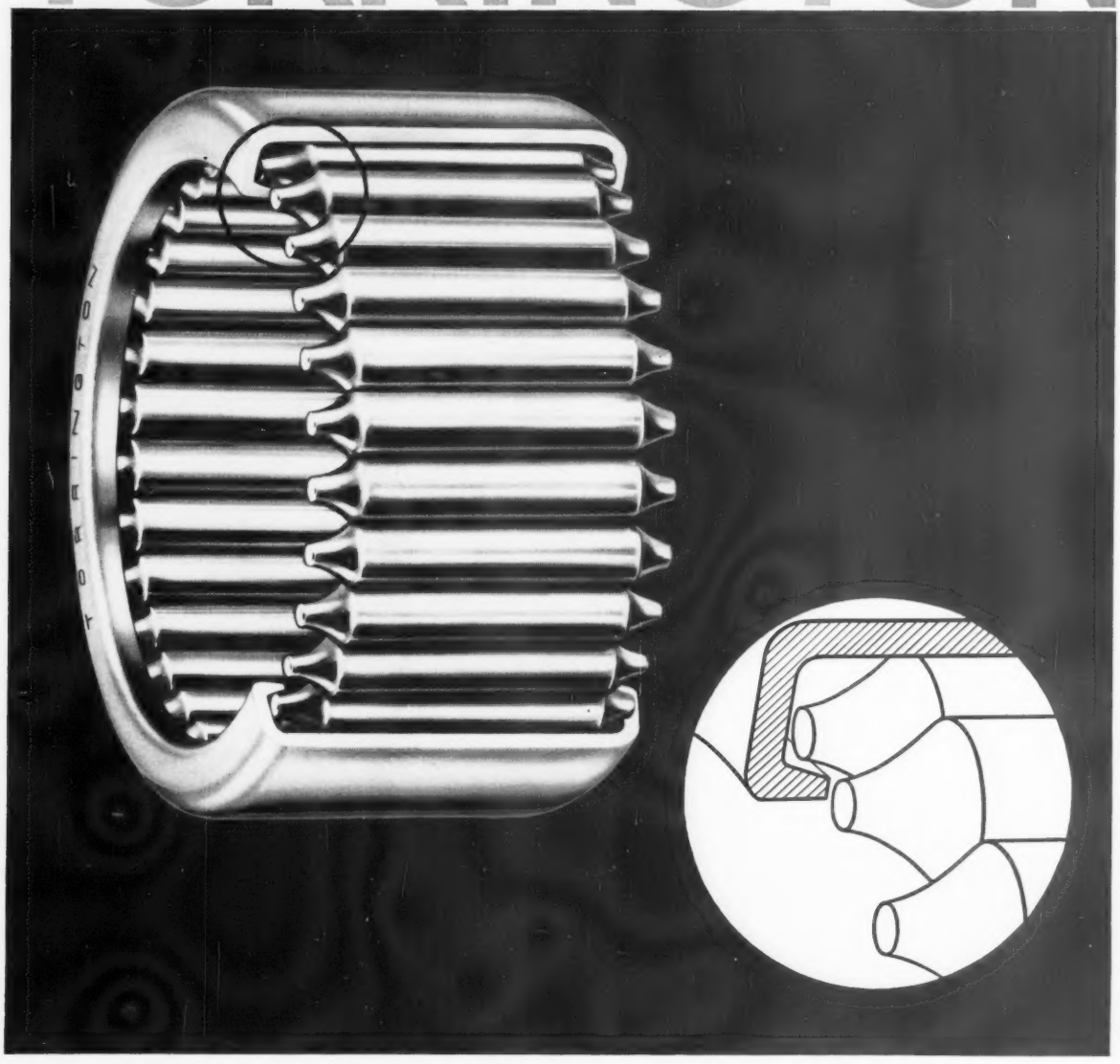
- **INDUSTRIAL PRODUCTION INDEX** (1947-49=100)
  Week ended May 13 . . . **161†**
  Year ago **162**
  Details on Page 93

- **PASSENGER CAR OUTPUT (UNITS)**
  Week ended May 20 . **130,000***
  Year ago **154,755**
  Details on Page 90

- **STEEL INGOT OUTPUT (TONS)**
  Week ended May 20 **2,025,000***
  Week ago **1,988,000**
  Details on Page 164

†Preliminary. *Estimated.

TORRINGTON



NEVER A SLIP 'TWIXT THIS CUP AND LIP

The Torrington Drawn Cup Needle Bearing is one of the easiest of all bearings to install and maintain. Secret is the turned-in lip construction. This lip positively retains the rollers... keeps them in position as a complete unit during all handling and assembly operations. Install it by simple press fit. No snap rings or shoulders are necessary.

That's not all. The Torrington Drawn Cup Needle Bearing also gives you a higher radial load capacity than any other bearing of comparable size. Precision rollers insure smooth, highly efficient performance, with a minimum of starting and running friction.

This bearing is compact, lightweight, economical. Its unit cost is surprisingly little. For details on how the Torrington Drawn Cup Needle Bearing can help your product, call or write Torrington... pioneer in needle bearings and maker of every basic type of antifriction bearing.

progress through precision

THE TORRINGTON COMPANY

TORRINGTON BEARINGS

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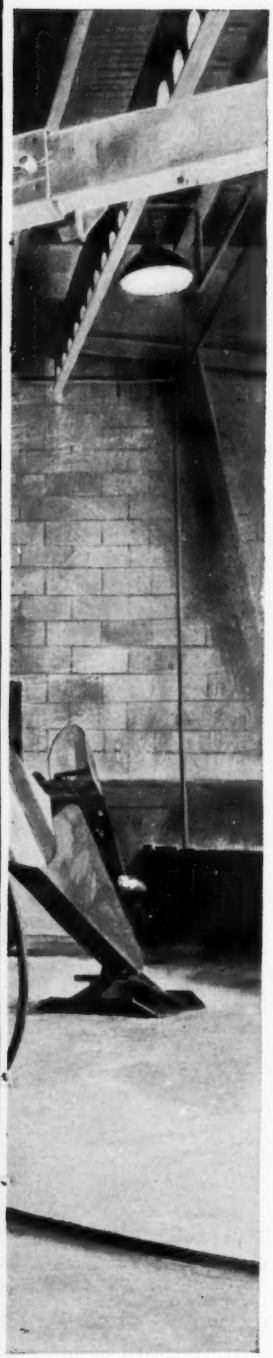
Mobil cuts costs at Chain Belt

At its Milwaukee plant, Chain Belt employs 28 in-plant materials handling units such as this vehicular crane. About two years ago, by changing to premium Mobil motor oil and grease, Chain Belt was able to extend oil change and greasing intervals on this automotive equipment. Resultant reduction of oil changes and grease jobs, plus oil filter savings, has amounted to $905.

Mobil

...latest savings $14,679!

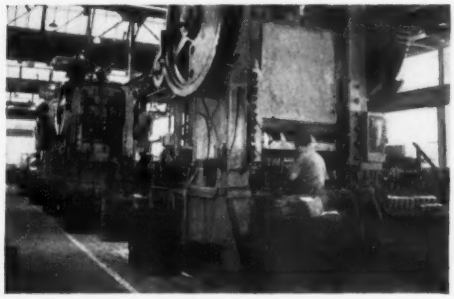


Having produced savings at Chain Belt Company for 20 years, the Mobil Program continues to cut lubrication costs further, reduce parts failures even more . . . has saved an extra $14,679 in the past 3 years!

The broad scope of Chain Belt's operation poses complex and unusual lubrication problems. One of the world's largest manufacturers of chains and sprockets and a pioneer in the field of power transmission, this Milwaukee company is also a leading producer of bulk material handling equipment, water sewage and waste treatment equipment, construction machinery and self-aligning roller bearings.

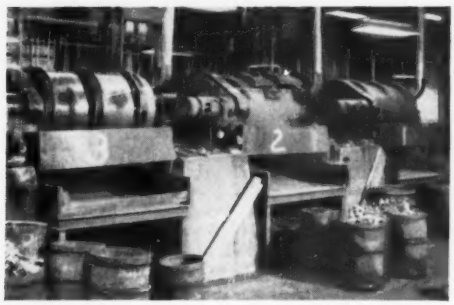
20 years ago, Chain Belt became one of the first industrial concerns to adopt the unique maintenance concept pioneered by Mobil—the Mobil Program of Correct Lubrication. Through Program methods, including a periodic review of oil analysis results, purchase practices, and lubrication intervals, Mobil Engineers continue to produce more efficient operation and new savings in a wide variety of areas. Overall, Chain Belt has effected savings of $14,679 in the past 3 years. Details of specific savings are discussed on these pages.

How is it possible for a lubrication program to produce cost reductions like this? Ask your Mobil Representative for the full details. Mobil Oil Company, 150 East 42nd Street, New York 17, New York.

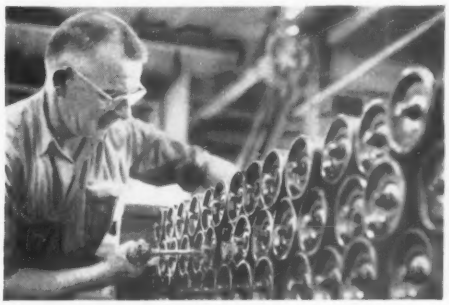


Leakage, make-up costs, frequent refillings and hazardous footing resulted from the use of a conventional lubricant in the automatic oilers on punch presses. At Mobil's suggestion, a change to a semi-fluid grease has saved $5,808 in 3 years . . . has also improved plant appearance and safety.

Periodic bearing failures on two carburizer furnaces were traced by Mobil to lubricant melt-out upon exposure to the 400° F. temperature above the furnaces. Substitution of a newly developed high temperature Mobil grease has reduced failures and cut application costs by $766 in 3 years.



Chain Belt employs several tumblers in its foundry to clean sand and burrs from castings. Heavy shock loads contributed to periodic failure of gear-head motor drives. A change to a new Mobil lubricant cut failures in half . . . saved $7,200 in labor and parts costs in a 3-year period.



Mobil also provides products and service for equipment manufactured by Chain Belt. Here, new Rex belt conveyor idlers are filled with a Mobil grease which protects against entrance of dirt and water during storage. Mobil rust preventive is also used to treat 4 million feet of chain annually.

Correct Lubrication

AT THE HEART OF THINGS

This 20th anniversary of the U. S. Savings Bonds program is an important milestone for the 45,000 companies, large and small, which offer the Payroll Savings Plan to their employees. Payroll Savings is the heart of the bond program, and the means by which millions of families have seen dreams realized since 1941. It has been good for business and industry... good for local communities... good for the nation's economic welfare. Above all it is good for the citizen who sees in each Savings Bond a share in his country's future.

If yours is one of the 45,000 participating companies, this anniversary year offers a good reason for renewed promotion. For help and suggestions, contact your State Savings Bonds Director, or write: **U.S. Savings Bonds Division, Treasury Department, Washington 25, D.C.**

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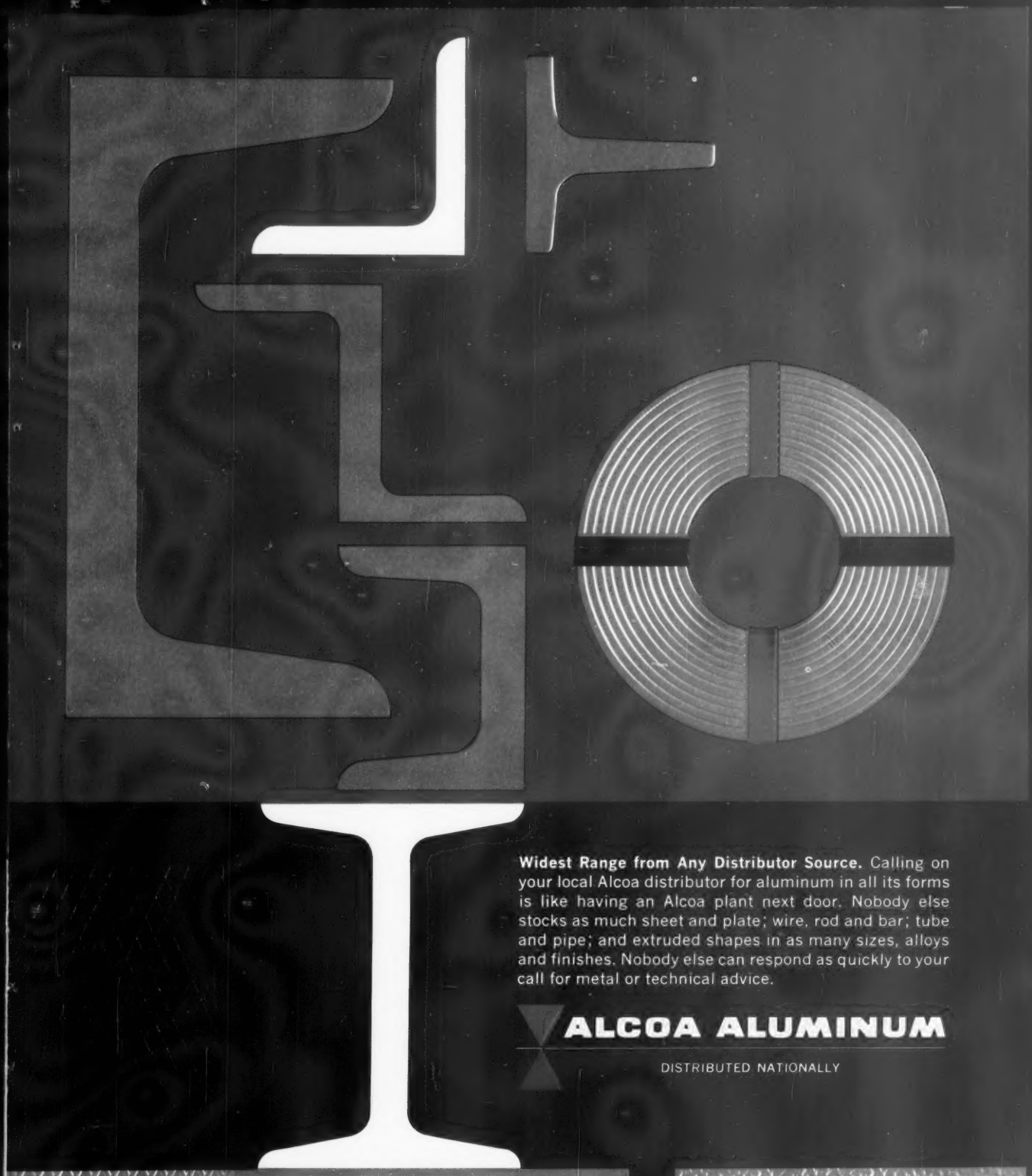

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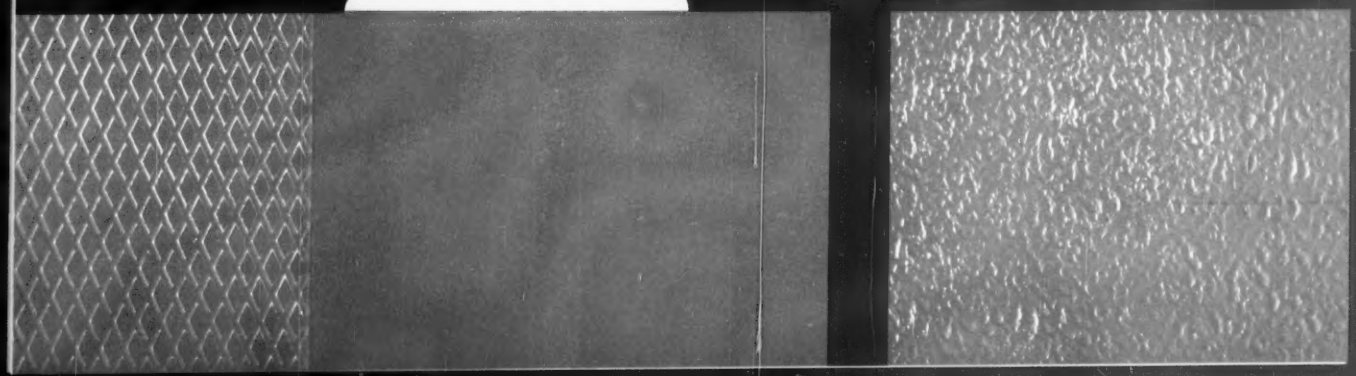

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CALIFORNIA
Berkeley 10
Ducommun Metals & Supply Co.
(Thornwall 1-1820)
Los Angeles 59
Benjamin Metals Company
(Rod & Bar) (Nevada 6-0611)
Los Angeles 54
Ducommun Metals & Supply Co.
(Ludlow 8-0161)
Los Angeles 22
Pacific Metals Company, Ltd.
(Raymond 3-5431)
Los Angeles 22
Tubesales (Tube & Pipe)
(Raymond 3-7781)
San Diego
Ducommun Metals & Supply Co.
(Gridley 7-3141)
San Diego 1
Pacific Metals Company, Ltd.
(Belmont 4-3253)
San Francisco 7
Pacific Metals Company, Ltd.
(Underhill 3-5600)
COLORADO
Denver 16
Marsh Steel & Aluminum Co.
(Keystone 4-1241)
Denver 16
Metal Goods Corporation
(Dudley 8-4141)
CONNECTICUT
Milford
Edgcomb Steel of New England, Inc.
(Trinity 4-1631)
Windsor
Whitehead Metals, Inc.
(Murdock 8-4921)
FLORIDA
Jacksonville 5
The J. M. Tull Metal & Supply Co., Inc.
(Evergreen 7-5561)
Miami
The J. M. Tull Metal & Supply Co., Inc.
(Oxford 6-0150)
Tampa 10
The J. M. Tull Metal & Supply Co., Inc.
(3-6741)
GEORGIA
Atlanta 2
The J. M. Tull Metal & Supply Co., Inc.
(Jackson 5-3871)
HAWAII
Honolulu 14
Aluminum Products Hawaii, Ltd.
(94-861)
IDAHO
Boise
Pacific Metal Company (3-6468)
ILLINOIS
Chicago 80
Central Steel and Wire Company
(Republic 7-3000)
Chicago 80
The Corey Steel Company
(Bishop 2-3000)
Chicago 23
Steel Sales Corporation
(Bishop 7-7700)
INDIANA
Indianapolis 18
Steel Sales Co. of Indiana, Inc.
(Liberty 6-1535)
KANSAS
Wichita
Marsh Steel & Aluminum Co.
(Whitehall 2-3231)
KENTUCKY
Louisville 3
Williams and Company, Incorporated
(Juniper 3-7781)

LOUISIANA
New Orleans 12
Metal Goods Corporation
(Jackson 2-7373)
MARYLAND
Baltimore 7
Whitehead Metals, Inc.
(Windsor 4-2000)
MASSACHUSETTS
Cambridge 39
Whitehead Metals, Inc.
(Trowbridge 6-4680)
Roxbury
Eastern Metal Mill Products Company
(Highlands 2-5900)
MICHIGAN
Detroit 12
Central Steel and Wire Company
(Twinbrook 2-3200)
Detroit (Hazel Park)
Meier Brass & Aluminum Co.
(Jordan 6-3902)
Detroit 10
Steel Sales Co. of Michigan
(Tyler 6-3000)
MINNESOTA
Minneapolis 13
Steel Sales Co. of Minnesota
(Sterling 1-4893)
MISSOURI
North Kansas City 16
Marsh Steel & Aluminum Co.
(Grand 1-3505)
North Kansas City 16
Metal Goods Corporation
(Grand 1-3516)
St. Louis 14
Metal Goods Corporation
(Harrison 7-1234)
St. Louis 10
Steel Sales Co. of Missouri, Inc.
(Prospect 1-5255)
NEW HAMPSHIRE
Nashua
Edgcomb Steel of New England, Inc.
(Tuxedo 3-7731)
NEW JERSEY
Elizabeth
Adam Metal Supply of New Jersey
(Flanders 1-2550)
Englewood
Tubesales (Tube & Pipe)
(Lowell 7-4400)
Harrison
Whitehead Metals, Inc.
(Humbolt 5-5900)
Hillside 5
Miller Steel and Aluminum
Division of Robert Campbell Co., Inc.
(Waverly 6-6000)
NEW YORK
Albany 1
Eastern Metals Warehouse, Inc.
(IV 9-3281)
Buffalo 17
Brace-Mueller-Huntley, Inc.
(TR 7-8700)
Buffalo 7
Whitehead Metals, Inc.
(TR 6-3100)
New York (Long Island City 1)
Adam Metal Supply, Inc.
(Stillwell 6-7737)
New York (Brooklyn)
Strahs Aluminum Company, Inc.
(Browning 2-7000)
New York 14
Whitehead Metals, Inc.
(Watkins 4-1500)
Rochester 5
Adam Metal Supply of Rochester
(Locust 2-4260)
Rochester 1
Brace-Mueller-Huntley, Inc.
(Congress 6-6560)
Rochester 10
Whitehead Metals, Inc.
(Butler 8-2141)
Syracuse 1
Brace-Mueller-Huntley, Inc.
(Howard 3-3341)
Syracuse 1
Whitehead Metals, Inc.
(Howard 3-6241)

NORTH CAROLINA
Charlotte 6
Edgcomb Steel Company
(Franklin 5-3361)
Greensboro
Edgcomb Steel Company
(Broadway 5-8421)
OHIO
Cincinnati 14
Central Steel and Wire Company
(Avon 1-2230)
Cincinnati 37
Williams and Company, Incorporated
(Valley 1-5555)
Cleveland 28
A. M. Castle & Co.
(Axminster 2-7600)
Cleveland 14
Williams and Company, Incorporated
(Utah 1-5000)
Columbus 12
Williams and Company, Incorporated
(Axminster 4-1623)
Toledo 12
Williams and Company, Incorporated
(Greenwood 5-8661)
OKLAHOMA
Tulsa 13
Metal Goods Corporation
(Temple 6-2561)
OREGON
Portland 9
Pacific Metal Company
(Capitol 7-0693)
PENNSYLVANIA
Philadelphia 34
Edgcomb Steel Company
(Garfield 3-6300)
Philadelphia 33
Metal Supply Company
(Center 6-0220)
Philadelphia 40
Whitehead Metals, Inc.
(Baldwin 9-2323)
Pittsburgh 33
Williams and Company, Incorporated
(Cedar 1-8600)
York
Edgcomb Steel Company (47-1931)
RHODE ISLAND
Slatersville
Edgcomb Steel of New England, Inc.
(Poplar 7-0900)
SOUTH CAROLINA
Greenville
The J. M. Tull Metal & Supply Co., Inc.
(Cedar 3-8366)
TENNESSEE
Memphis 6
Metal Goods Corporation
(Whitehall 8-3407)
TEXAS
Dallas
McCormick Steel Company
(CH 7-3104)
Dallas 35
Metal Goods Corporation
(Fleetwood 1-3271)
Houston 1
McCormick Steel Company
(OR 2-6671)
Houston 1
Metal Goods Corporation
(Riverside 7-1110)
UTAH
Salt Lake City 1
Pacific Metals Company, Ltd.
(Davis 2-3461)
WASHINGTON
Seattle 8
Ducommun Metals & Supply Co.
(Parkway 5-1500)
Seattle 4
Pacific Metal Company (Main 2-6925)
Spokane 4
Pacific Metal Company
(Keystone 5-3681)
WISCONSIN
Milwaukee 1
Central Steel and Wire Company
(Humboldt 1-5000)
Milwaukee 9
Steel Sales Co. of Wisconsin
(Hilltop 2-2020)

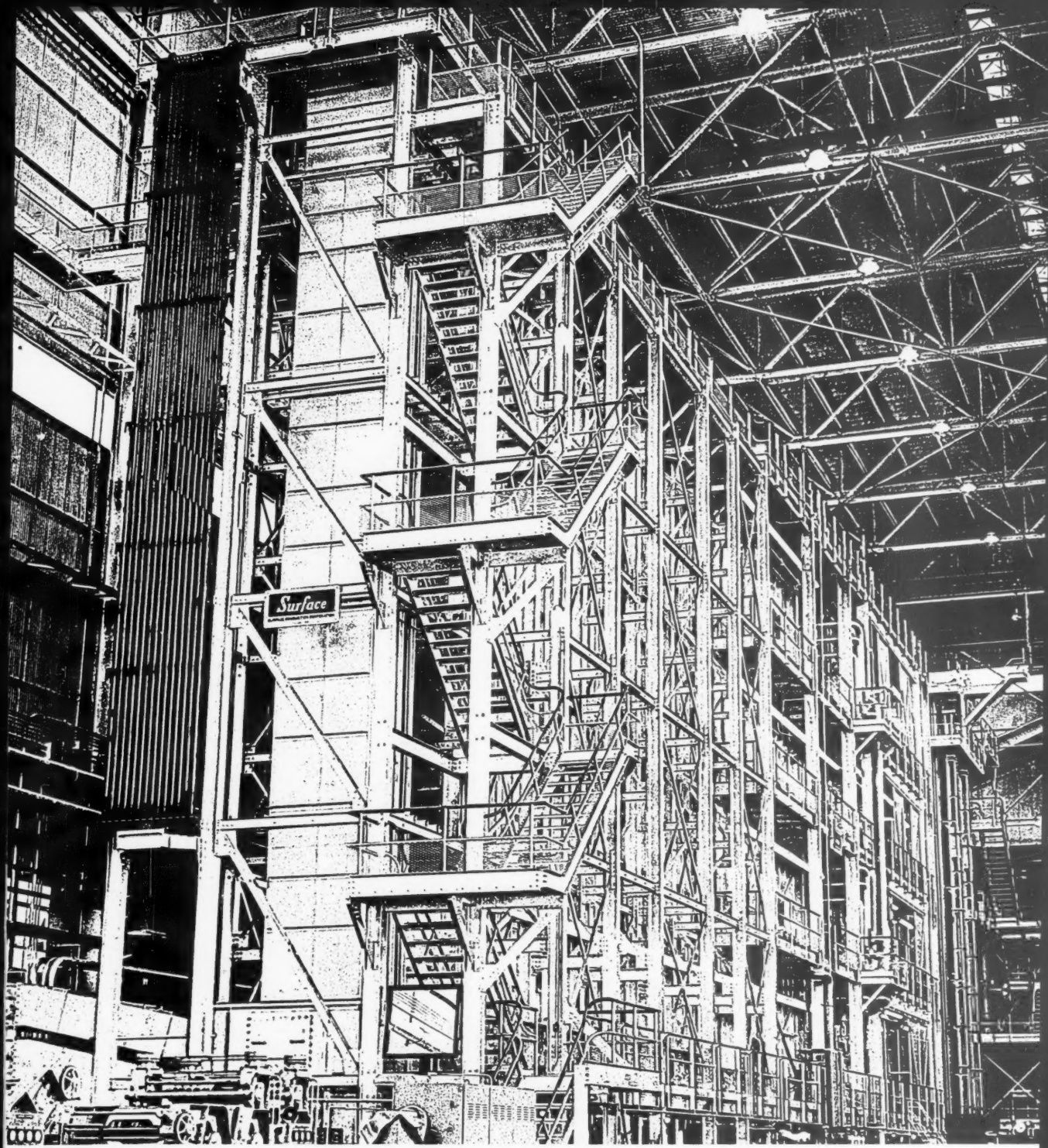
Call The Aluminum Man . . . his stock's the most complete!

Your Alcoa distributor sales representative—*The Aluminum Man*—maintains a warehouse bulging with sheet and plate; tube and pipe; extruded shapes; wire, rod and bar. His stock represents the widest range of aluminum products available from any distributor source. He can arrange for them to be slit, sawed or sheared to your specifications—furnish technical advice you may need on alloy selection and fabrication techniques. He's your fastest supply line for aluminum in any form when you need it. Your nearest Alcoa distributor is listed on this page, so give him a call . . . soon. Aluminum Company of America, 845-S Alcoa Building, Pittsburgh 19, Pa.

ALCOA ALUMINUM

DISTRIBUTED NATIONALLY

Call *The Aluminum Man* . . . he's your Alcoa distributor sales representative



Courtesy Columbia-Geneva Steel Division, United States Steel Corporation

Sign of performance better than specified: The modern tin plate industry demands highest quality at lowest operating cost—requirements which can be met only with continuous annealing, a process pioneered by Surface. This Surface installation produces 96,000 lbs/hr of .010″ strip at speeds up to 1500 fpm. Address inquiries to 2408 Dorr Street, Toledo, Ohio.

SURFACE

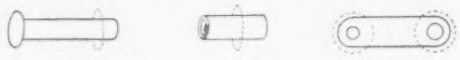
SURFACE COMBUSTION, Toledo 1, Ohio/ a division of Midland-Ross Corporation MR

FAR LESS STRESS IN LXS

THE CHAIN WITH NO "STRESS RAISERS"!
Link-Belt LXS brings long-term economy and efficiency to the most punishing drive and conveying jobs. With its "FULL-ROUND" design, LXS has no stress concentration points . . . none of the sharp corners which frequently shorten the life of many ordinary chains.

LXS is available with straight or offset sidebars. For details, contact your nearest Link-Belt office or authorized stock-carrying distributor. (See CHAINS in the yellow pages of your phone book.) Ask for our new, comprehensive Catalog 1050.

They're all of "FULL-ROUND" design



PINS BUSHINGS SIDEBARS

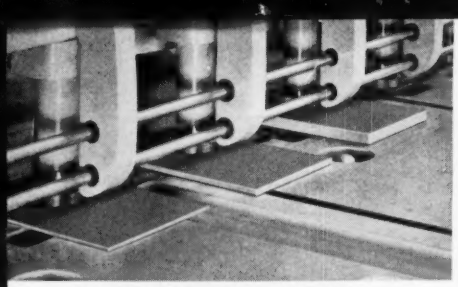
"FULL-ROUND" design eliminates traditional stress concentration points in Link-Belt LXS . . . provides maximum live bearing area between pins and bushings. Result: stress is distributed evenly.

Other LXS long-life features include controlled press fits plus use of selected steels and controlled hardening of all parts. All this contributes to greater uniformity, greater endurance.

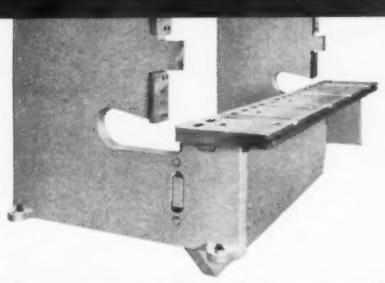
LINK-BELT

CHAINS AND SPROCKETS

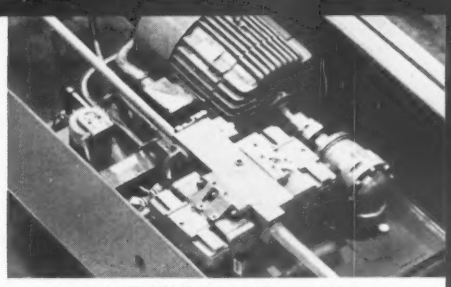
LINK-BELT COMPANY: Executive Offices, Prudential Plaza, Chicago 1. To Serve Industry There Are Link-Belt Plants, Warehouses, District Sales Offices and Stock Carrying Distributors in All Principal Cities. Export Office, New York 7; Australia, Marrickville (Sydney); Brazil, Sao Paulo; Canada, Scarboro (Toronto 13); South Africa, Springs; Switzerland, Geneva. Representatives Throughout the World. 15,063



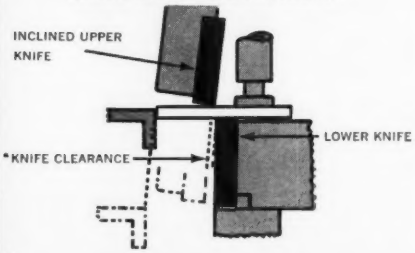
Hydraulic holddowns hold work securely.



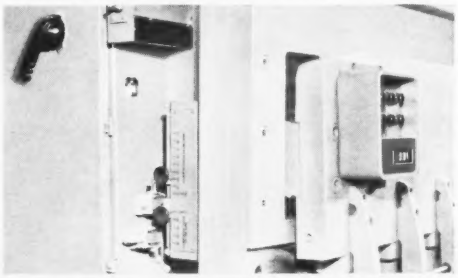
Interlocked construction eliminates load supporting welds.



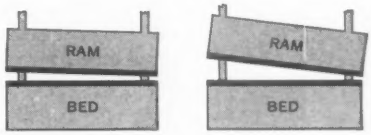
Compact manifold block replaces usual piping.



Inclined ram makes use of four edge knives practical.

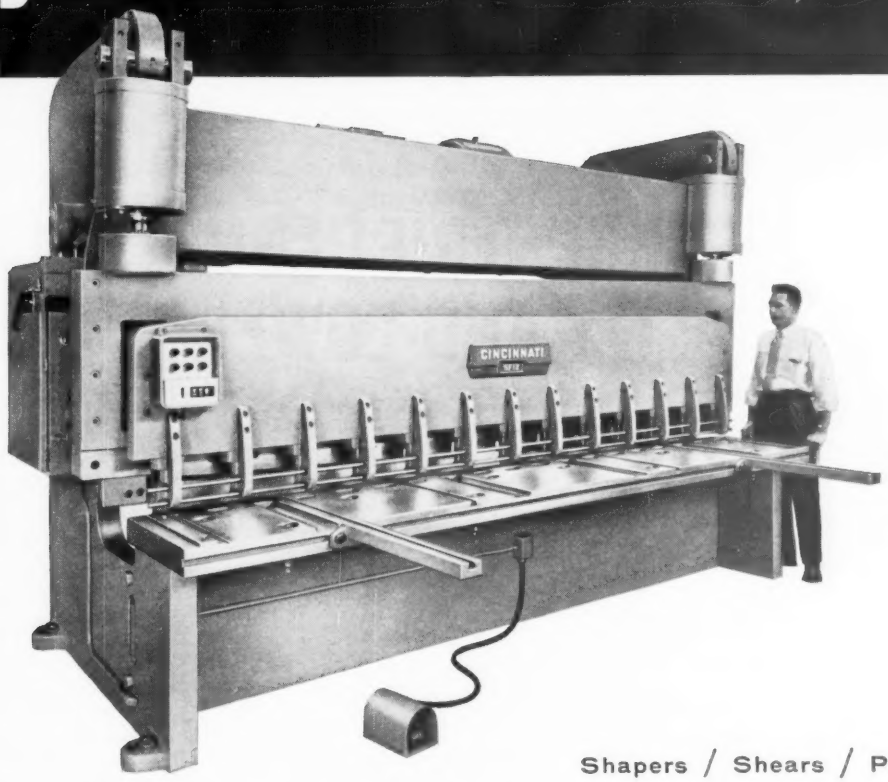


Centralized controls improve operator's productivity.



Adjustable rake gives you extra shearing capacity.

CINCINNATI® hydraulic shears



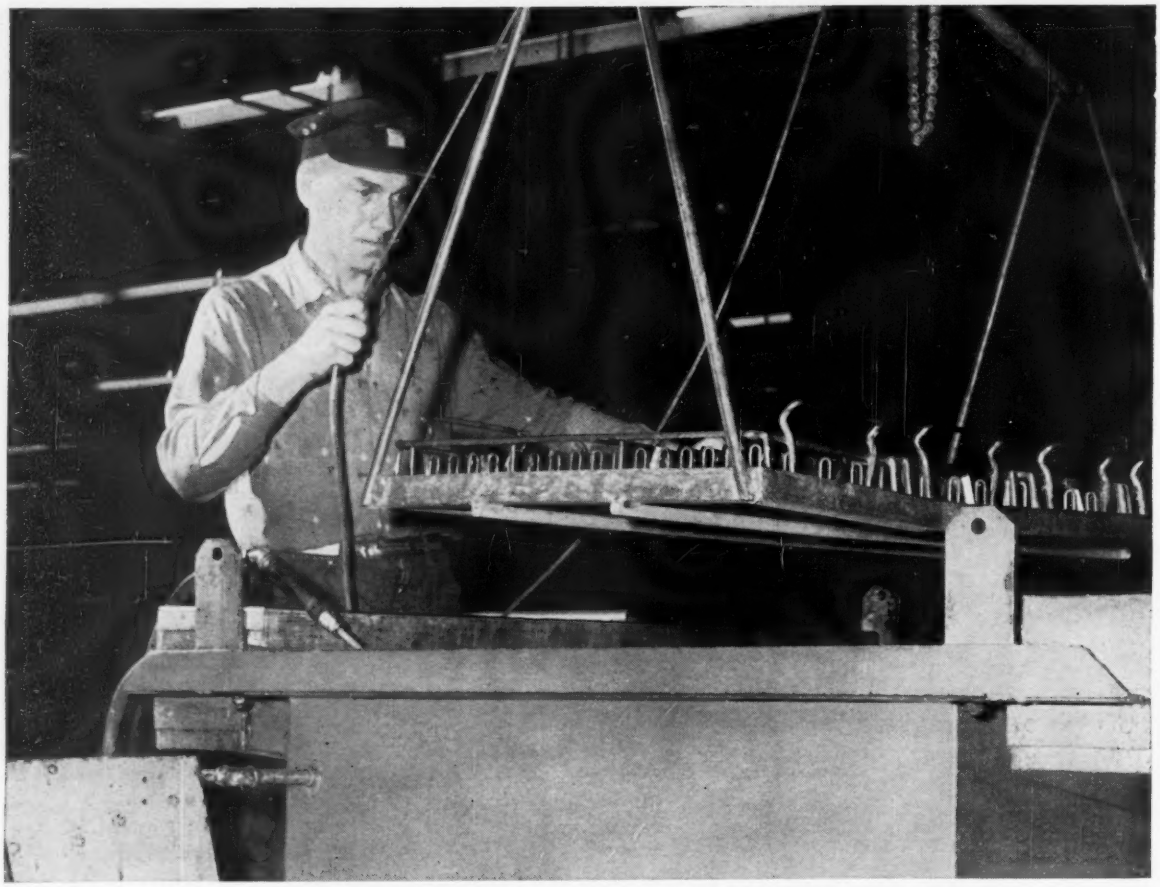
Cincinnati Hydraulic Shears include in the standard price many features which cost extra on competitive shears. Several of these are shown above. Combined with an exceptional range of shearing capacity in one frame, they make any Cincinnati Hydraulic Shear a profitable investment. Request Bulletin HS-1 for complete details and features.

Shapers / Shears / Press Brakes

THE CINCINNATI SHAPER CO.

Cincinnati 11, Ohio, U.S.A.

United Kingdom: The Cincinnati Shaper Co., Ltd., Glasgow, Scotland



WHERE HOOKER TRICHLORETHYLENE RAISED QUALITY AND LOWERED COSTS

Approximately a year ago, the Metals Processing Division, Curtiss-Wright Corporation, began using high-quality Hooker NIALK® TRICHLORETHYLENE to degrease jet engine blades. Before this, maintaining purity in the baths required frequent cleanouts. Chemical costs were high.

Immediate results with Nialk showed a better cleaning job and tighter quality control. Down time for degreaser maintenance has been substantially reduced.

The exceptional cleaning results now obtained permit inspectors to discover possible flaws more easily. Maintaining quality is far less difficult.

The stabilizer in Nialk TRICHLOR contains *psp*—permanent staying power—which enables the stabilizer to operate efficiently until cleanout. After cleanout, the solvent is distilled for further use in other operations.

Curtiss-Wright officials say that the assistance they obtain from Hooker technical experts in preventing waste is most important, since they are working with costly metals. Because the degreasing baths have never turned acid, problems in keeping their quality at a high level and the necessity to run tests have been reduced. Whatever your degreasing job or the type of metal you're processing, Nialk TRICHLOR can give you a greater volume of work and reduce your costs, as well as provide a smooth-running operation.

Contact your nearest Hooker Chemical Distributor for information. Or write us. We will be glad to help you with any problems.

HOOKER CHEMICAL CORPORATION

1205 UNION STREET, NIAGARA FALLS, NEW YORK

HOOKER CHEMICALS PLASTICS

Sales offices: Buffalo, Chicago, Detroit, Los Angeles, New York, Niagara Falls, Philadelphia, Tacoma, Worcester, Mass. *In Canada:* Hooker Chemicals Limited, North Vancouver, B.C.

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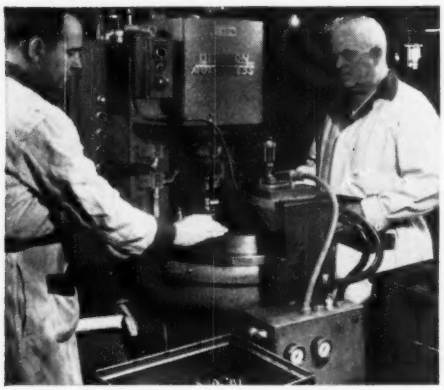
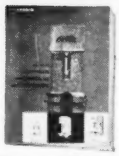
DENISON HydrOILics

How **STEWART-WARNER** produces 220 different assemblies on one **DENISON** Multipress and saves...

MONEY



THIS NEW SERIES "R" MULTIPRESS *assembles 220 different assemblies and prepares them for brazing at Stewart-Warner Corp., Chicago. Write for free Bulletin 324—New "R-S-T" Series Multipress.*



COST-SAVING versatility was a key requirement on this pressing job. To produce assemblies for a new product line, Stewart-Warner's Alemite Division needed a press set-up that could handle up to 220 different assemblies. And because of the short runs involved, fast changeover with minimum downtime was a must. *Installation of just one Denison hydraulic Multipress filled the bill.*

This Denison Series "R" 6-ton bench press, equipped with automatic index table and special "quick-change" tooling, assembles from 600 to 850 assemblies per hour. Finished parts are uniform, high-quality . . . *no rejects.* And tooling changes can be made in minutes to accommodate the full range of 220 different types and sizes.

A unique feature of this operation is an adjustable applicator mounted on the index table that automatically applies a metered amount of brazing compound to each two-piece assembly. It completely eliminates a former hand operation—*and does the job better.*

What's *your* problem? Ask the nearby Denison Production Specialist about a **M**ultipress **A**nalysis **P**rogram in your plant now. It can **MAP** new ways to cut your costs, get better quality finished products.

DENISON ENGINEERING DIVISION
American Brake Shoe Company
1180 Dublin Road • Columbus 16, Ohio

HYDRAULIC PRESSES
PUMPS • MOTORS • CONTROLS

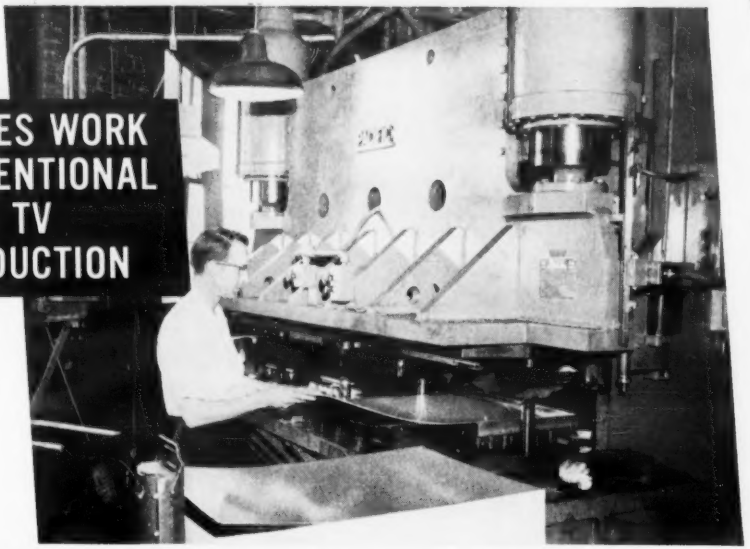
DENISON
HYDRAULIC MULTIPRESS

15 years engineering and millions of dollars invested* to perfect the world's finest brake... today's PACIFIC HYDRAULIC PRESS BRAKE

Over 9 out of every 10 hydraulic press brakes in operation today are PACIFIC providing...

- More dependability
- Freedom of maintenance and leakage
- Simpler electric controls
- Simpler hydraulic control
- More accuracy in level control
- More accuracy in air bending
- More operating convenience
- Greater visibility
- More rigidity in cylinder construction
- Shock-free hydraulic system suitable for punching

PACIFIC DOES WORK OF 3 CONVENTIONAL BRAKES IN TV TRAY PRODUCTION



960 TV trays per hour drawn, trimmed and finished on a single 150 ton Pacific hydraulic press brake is reported from Quaker Stretcher Company, Kenosha, Wisc. Contrasted to 3 single-operation mechanical presses, the Pacific hydraulic set-up on 36" wide by 8 foot long platen features partial draw on the first die, shearing two trays and finished draw on the second die, putting bead on reverse draw edge on third die. Shockless hydraulic operation completely eliminates previous periodic breakdown of 80 blank holder springs. Single Pacific press reduces machinery investment, lowers materials handling cost.

*THIS INVESTMENT ENABLED PACIFIC TO INTRODUCE:

- Tape control to synchronize cylinders within .003" (1947)
- Cushioned punching (1949)
- Precision depth control to repeat accuracy within .001" (1951)
- Manual turret stroke controls for progressive bending (1952)
- Selective anti-whip speeds to eliminate reverse bends (1952)
- Tandem operation of press brakes for forming pieces 40 ft. or longer (1953)
- Tonnage control to protect light dies in heavy press (1953)
- Multiple hydraulic cushion cylinders for deep drawing (1954)
- Overhead integral power unit for increased accuracy (1955)
- Cylinder ram guides for increased rigidity (1956)
- Shearing attachment for shearing heavy plate on press brake (1958)
- Pipeless stacking of valves to eliminate pipe breakage and leakage (1959)
- Shockless hydraulic valving to eliminate cause of leakage (1959)

PACIFIC PRESSES AND SHEARS

PACIFIC INDUSTRIAL MFG. CO., OAKLAND, CALIF. • PACIFIC PRESS AND SHEAR CORP., MT. CARMEL, ILL.

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A Tinnerman T-Marked Original...

Dual SPEED NUTS® open door to 20% savings on as-assembled cost

Gibson refrigerator door hinges are held in place with new cost-cutting, time-saving twin-type SPEED NUTS. They replace 3/16" plate hinge retainers which had to be drilled and tapped for machine screws.

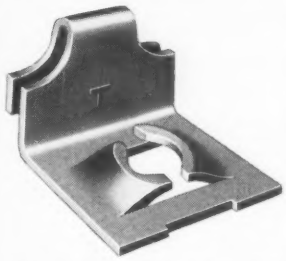
Gibson Refrigerator analysts estimate that special twin-type SPEED NUTS save 14% on the cost of each hinge retainer assembly, 20.5% on the as-assembled cost. Labor is reduced by half. Former problems with cross-threading and stripping are eliminated . . . SPEED NUTS and A-type screws go together naturally every time—and faster!

The T-mark of quality and dependability identifies the more than 10,000 variations of SPEED NUT brand fasteners. From this unlimited selection come many saving opportunities for you. Ask your Tinnerman representative to arrange for a free FASTENING ANALYSIS of your product. An engineering service that may produce similar savings for you.

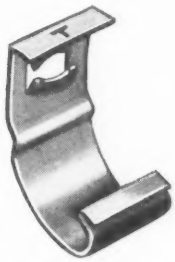
You'll find Tinnerman under Fasteners in your SWEET'S Product Design File and in the "Yellow Pages." *Tinnerman Products, Inc., Dept. 12, Box 6688, Cleveland 1, Ohio.*

TINNERMAN
Speed Nuts®
Look for the Tinnerman "T"

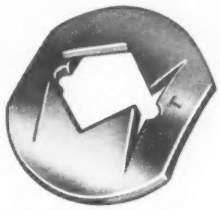
OTHER T-MARKED SPECIALS



SPECIAL "J" SPEED NUT cuts production time in half for a major gas range manufacturer. Simplified right-angle panel or brace attachments for a variety of appliance, cabinet, and instrument applications. Live-spring tension means a vibration-proof grip.



SNAP-IN FIXTURE FASTENER developed specially for Imperial Lighting Products Co., trimmed 80% off lighting fixture assembly time. Once fastened to the ceramic socket, this unique SPEED NUT snaps quickly into the fixture base...replaces three parts.



PUSH-ON SPEED NUT anchors latching bars on steel desks, reduces material and assembly costs by 50%. Push-on SPEED NUTS can be attached on studs, rivets, or tubing in a split second, and eliminates need for threaded parts . . . saves time and money.

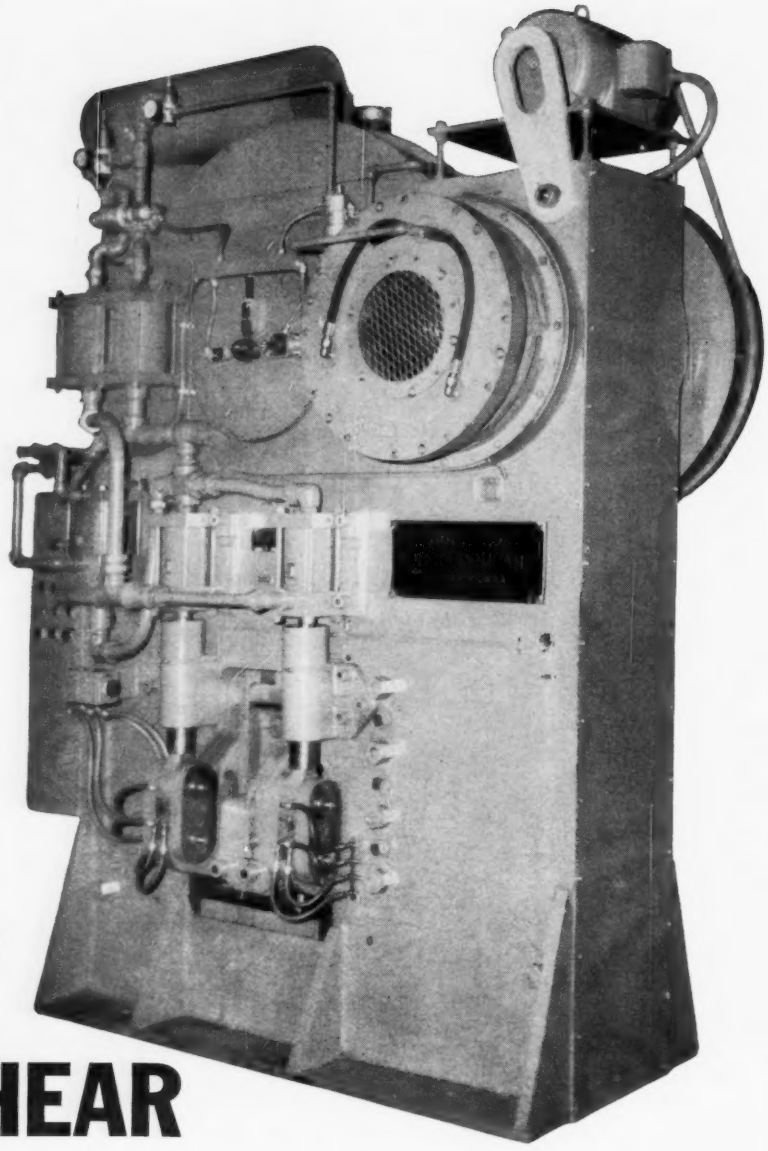
CANADA: Dominion Fasteners Ltd., Hamilton, Ontario. GREAT BRITAIN: Simmonds Aerocessories Ltd., Treforest, Wales. FRANCE: Simmonds S.A., 3 rue Salomon de Rothschild, Suresnes (Seine). GERMANY: Mecano Simmonds GMBH, Heidelberg.

HIGH SHEARING SPEED—Up to 18,000 cuts per 8 hour shift.

CLEAN, SQUARE CUTS—Shows up hidden defects.

COMPACT DESIGN—Saves floor space.

AUTOMATIC FEED TABLES—Available to your requirements.



'BUFFALO' BILLET SHEAR

Now—enjoy peak production on your billet cutting jobs. This new 'Buffalo' Billet Shear is ruggedly-built for maximum years of dependable, trouble-free performance. Greatest output at lowest cost is assured by efficient high speed operation. Clean, square cut billets permit high quality finished forgings. Features include alloy steel frame, electrical controls and pneumatic automatic oiling system.

For full details, including capacities available, contact your machine tool dealer or write us direct.

ESTABLISHED 1877 "Buffalo" MEMBER N.M.T.B.A.

MACHINE TOOL DIVISION

BUFFALO FORGE COMPANY

Buffalo, New York

Canadian Blower & Forge Co., Ltd., Kitchener, Ont.

'Buffalo' Air Handling Equipment to move, heat, cool, dehumidify and clean air and other gases.

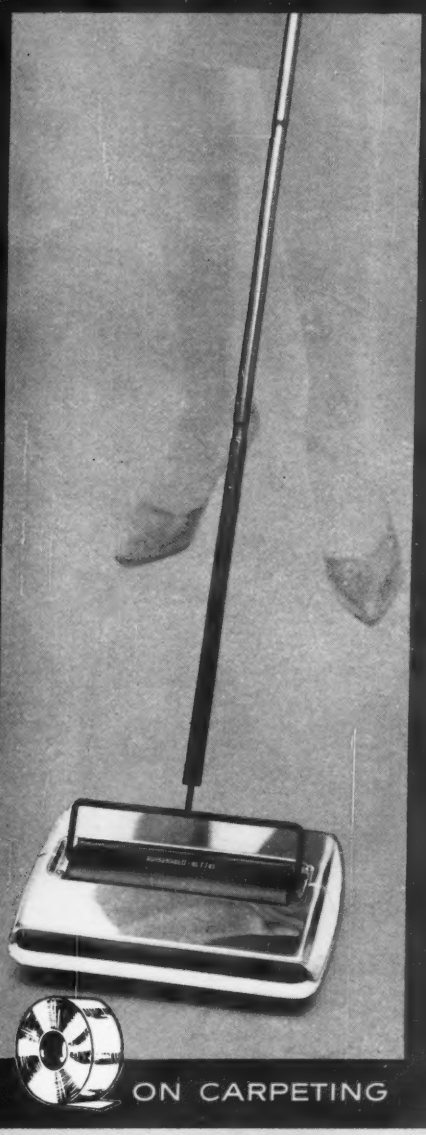
'Buffalo' Machine Tools to drill, punch, shear, bend, slit, notch and cope for production or plant maintenance.

'Buffalo' Centrifugal Pumps to handle most liquids and slurries under a variety of conditions.

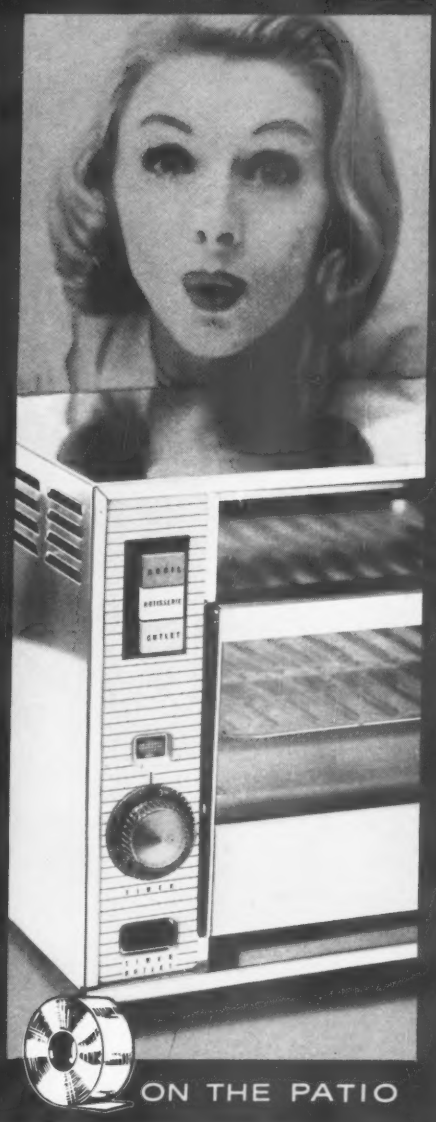
Squier Machinery to process sugar cane, coffee and rice. Special processing machinery for chemicals.

NICKELOID IS EVERYWHERE

ON THE MANTLE



ON CARPETING



ON THE PATIO

These eye-catching products use functionally a basic Nickeloid Metal. The finish of Chromium, Nickel, Brass or Copper is electroplated to a base metal, usually Steel (but often Zinc, Brass or Copper).

Mostly, Nickeloid Metals are supplied in continuous coils in widths up to 24" for modern, low cost fabrication. They're also available in sheets and strips. Optional: bright or satin finishes, plating one or both sides, a galaxy of stunning patterns and crimps.

Quality plating produces metals so durable they can be fabricated, even quite severely drawn or bent. Rejects minimized. For severe stamping, we offer Mar-Not protective coating that is easily peeled off after its job is done.

Which is your preference in modern metals — the clean, flint-hard gleam of Chromium, the warmth of Copper, or the rich radiance of polished Brass? No need to answer now, but consider the galaxy of wonderful products you find everywhere today that employ one of the Nickeloid Metals. These durable, lustrous finishes are not mere lily-gilding. In most instances they are designed INTO the product . . . functionally. We make a raw material that has been given these quality finishes the *automated* way . . . in giant coils in block-long mills. Nickeloid finishes are electroplated to the base metal *before fabrication,* a process as fundamental we believe as the coating of printing papers in rolls *before they are printed.* Three out of five costly manufacturing steps are by-passed. Write for our free Introductory Kit, which includes metal samples — learn the complete story.

Design Engineering Show (Booth #1042)
Cobo Hall, Detroit, Mich., May 22-25

AMERICAN NICKELOID COMPANY • PERU 1, ILLINOIS

America's Pioneer Manufacturer of Pre-Finished Metals — Since 1898

If you're looking for the simple, economical way to meet your steel needs, it will pay you to *look locally* . . . to look to your nearest Steel Service Center. There you'll find:

PROMPT DELIVERY—usually from LOCAL stocks.

WIDE SELECTION—many types available from your LOCAL Steel Service Center.

FABRICATION ASSISTANCE—the right answers to your design and fabrication problems . . . supplied by LOCAL qualified specialists.

LOWER INVENTORY INVESTMENT—an expense borne instead by your LOCAL Steel Service Center.

STORAGE SPACE—also furnished by your LOCAL supplier.

Get in touch with your dependable LOCAL source for steel . . . your Steel Service Center. See your Classified Telephone Directory for listings.

Alan Wood supplies major Steel Service Centers with high quality plate, sheet and strip . . . chances are *your* Steel Service Center is among those we serve.

ALAN WOOD STEEL COMPANY

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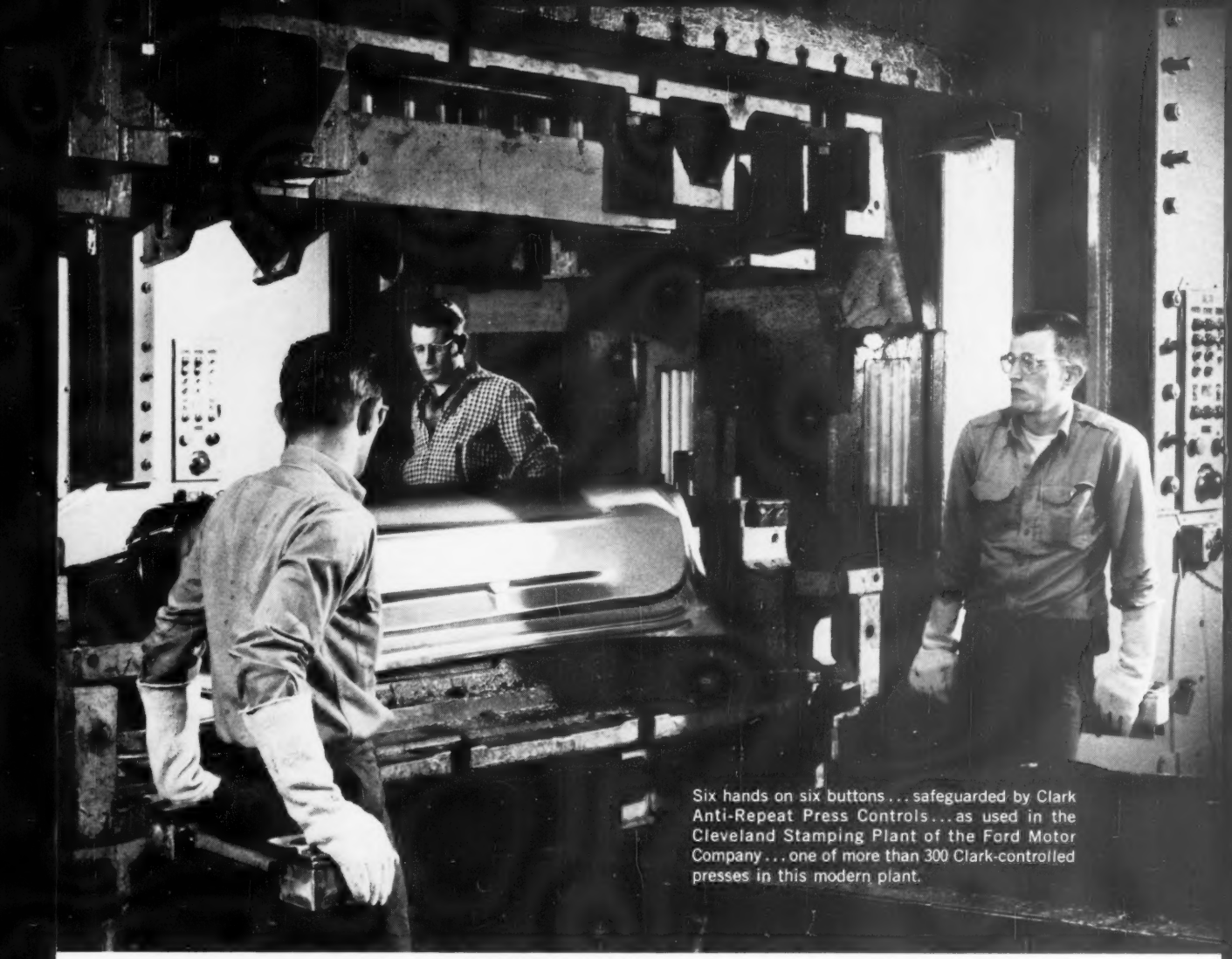


Six hands on six buttons . . . safeguarded by Clark Anti-Repeat Press Controls . . . as used in the Cleveland Stamping Plant of the Ford Motor Company . . . one of more than 300 Clark-controlled presses in this modern plant.

How to make your presses most considerate of MEN, MACHINES and MONEY

It's just a little short of amazing what a difference the right press controls can make. Clark Press Controls, for instance, are designed to guard against every conceivable unsafe condition, while assuring maximum production.

Benefits reported by our customers after standardizing on Clark Press Controls include:

- *Fewer accidents, resulting in lower industrial insurance rates.*
- *Greater protection against damage to expensive presses and dies.*
- *Substantial reduction in costly downtime.*

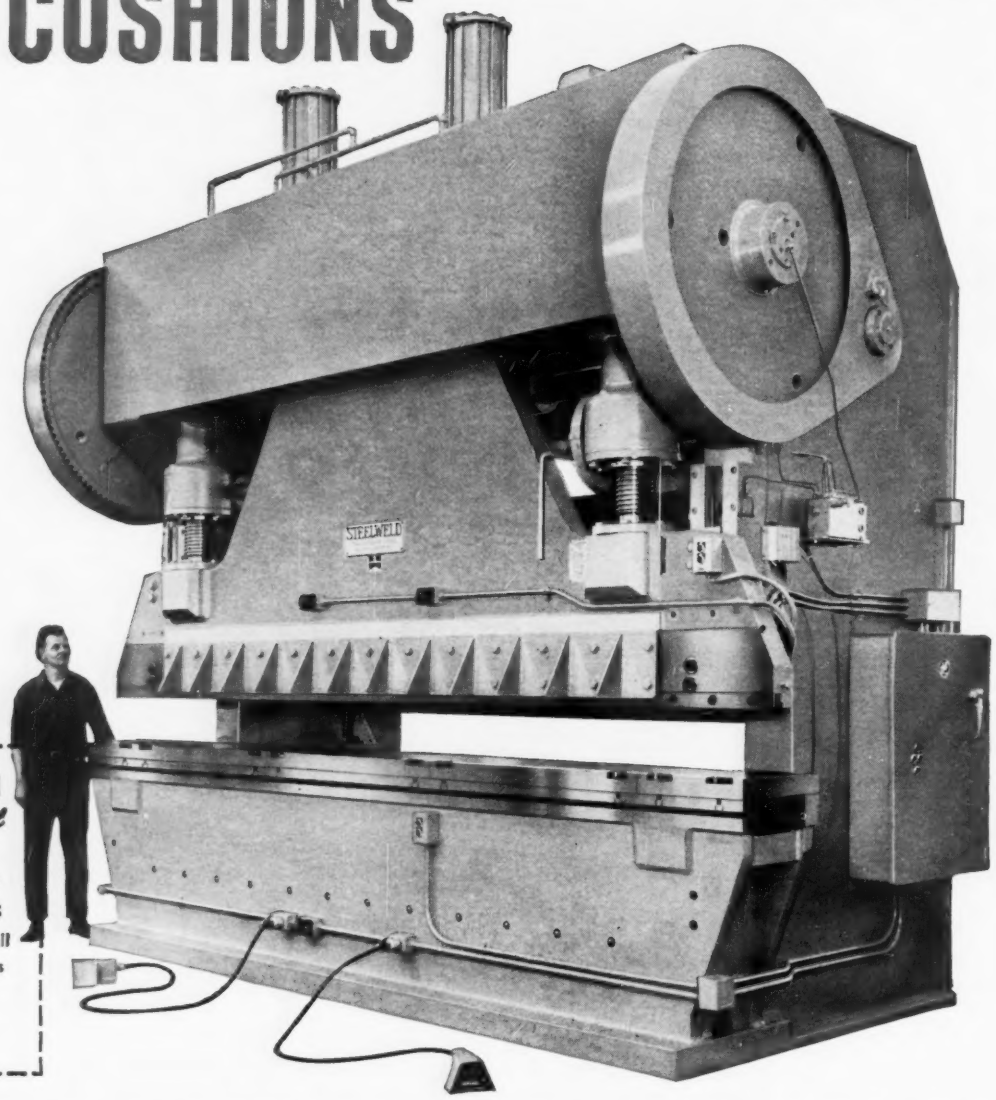
Today, there are more than 20,000 of our press controls in operation throughout industry. In automotive plants, Clark Press Controls outnumber those of all other manufacturers combined. Good reason to talk to Clark about *your* press control requirements . . . to call the nearest Clark sales office, or write: 61PC1

THE CLARK CONTROLLER COMPANY

MAIN PLANT: CLEVELAND, 10 • **WESTERN PLANT:** LOS ANGELES, 58
IN CANADA: CANADIAN CONTROLLERS, LIMITED, TORONTO, ONT.

PRESS BRAKES with DIE CUSHIONS

This die-cushion-equipped mechanical Steelweld press brake has two speeds, 7 and 20 strokes per minute. Stroke length is 6 inches. Shut height is 20 inches.



Steelweld *Mechanical and Hydraulic* **Press Brakes** are available in all sizes to 2000 tons capacity for plate lengths to 30 feet.

Steelweld Press Brakes — mechanical or hydraulic — can be furnished with die cushions built in.

The brake illustrated was provided with twelve pneumatic die cushions assembled in a single line between the two bed plates. Each has a rating of four tons, or 48 tons total, when operated at 100 lbs. air pressure. Maximum capacity is 60 tons at 125 lbs. air pressure. Stroke of the cushions is adjustable from 0 to 3 inches.

The machine is rated 400 tons and will bend 12′ x ½″ mild steel between housings. Total length of bed and ram is 16′-0″ including 10-inch extensions at both ends. The double plate bed is 20″ wide. The ram has detachable brackets on either side. Throat depth is 18″. Air-operated ram counterbalances are provided.

Control is air-electric with two foot stations for operation by one or two men. It includes "inch" and "run" with automatic stop at top of stroke. Ram adjustment is motorized. Back gauge has a range of 48 inches and rides on ball bearings. It is motor driven and front operated.

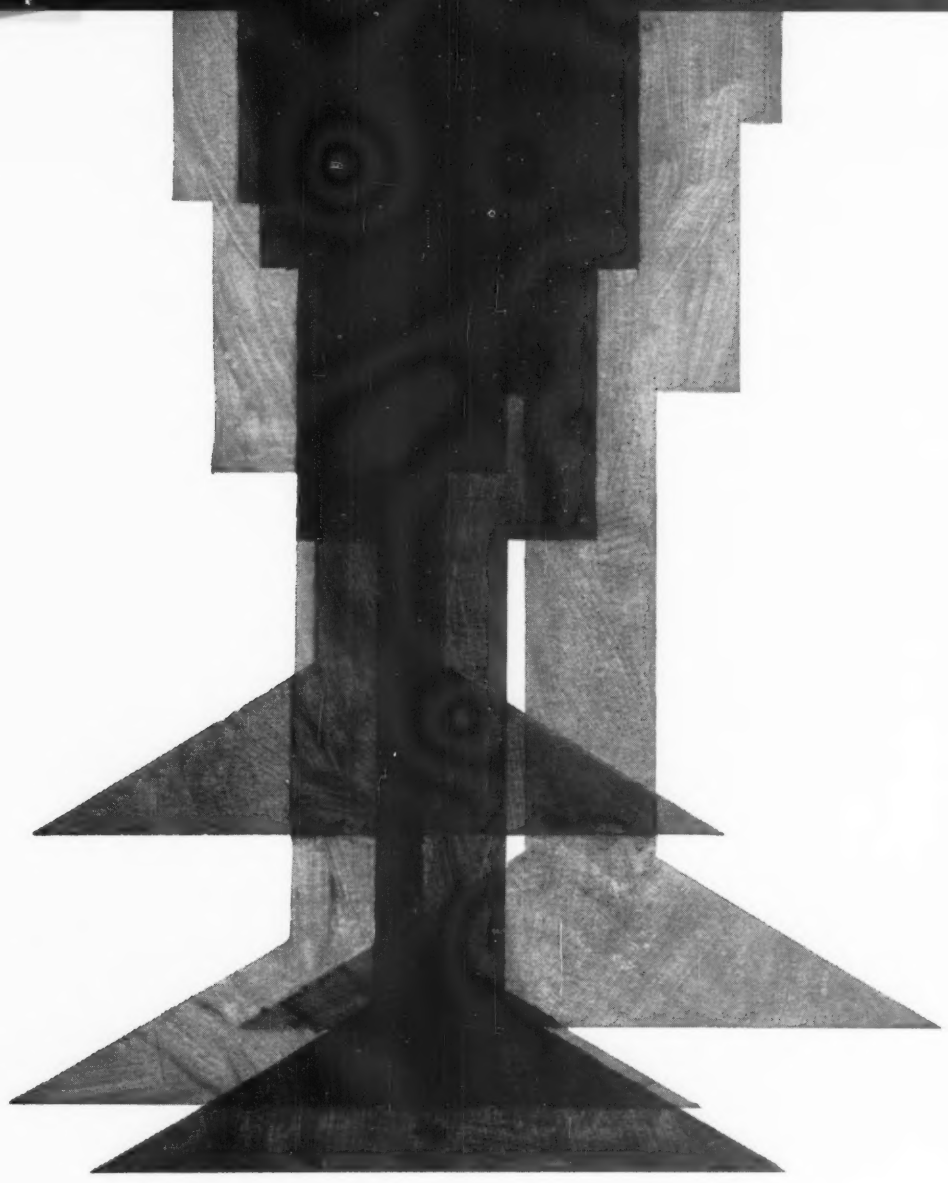
The design of Steelweld brakes simplifies the incorporation of die cushions and various features found helpful for metal forming operations. Therefore, it is possible to include at reasonable cost special features that will speed or aid unusual forming work.

Write for free booklet No. 2023

STEELWELD
Mechanical and Hydraulic
PRESS BRAKES

Steelweld Machinery includes: Mechanical & Hydraulic Shears and Press Brakes, One-, Two- and Four-Point Straight-Side Presses, Speed-Draw Presses.

STEELWELD MACHINERY DIVISION • THE CLEVELAND CRANE & ENGINEERING CO. • 7880 E. 281 ST. • WICKLIFFE, OHIO



Improved Kaiser Permanente 84 Ramming and Patching Mix

BOND STRENGTH SIX TIMES GREATER!

From steel-making surface down to hearth brick . . . from cold start-up to operating temperatures . . . improved Permanente 84 rammed bottoms and patches have dramatically greater bond strength. ■ The table below shows cold crushing strengths up to six times greater for new Permanente 84—developed from one end of the critical temperature zone to the other. These strengths are achieved without sacrificing refractoriness under load. Permanente 84 goes directly from strong chemical bond to strong ceramic bond. High density is preserved throughout for greater protection against penetration, erosion, impact, and thermal shock. ■ For information and new technical folder about improved Permanente 84—or its companion Permanente 165 ramming mix—contact your Kaiser Sales Engineer, or write Kaiser Refractories & Chemicals Division, Kaiser Aluminum & Chemical Sales, Inc. □ □ □ □ (Canadian subsidiary: Refractories Engineering & Supplies, Ltd.)

COLD CRUSHING STRENGTHS:

TEMPERATURE	OLD 84	NEW 84
300° F.	1500 psi	9000 psi
480° F.	1740 psi	8500 psi
840° F.	1395 psi	9030 psi
1200° F.	1925 psi	10050 psi
1560° F.	1700 psi	10750 psi

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ACT APPLICATION CONSULTING TEAM: created to achieve greater refractories economy and efficiency. Ask for free booklet.

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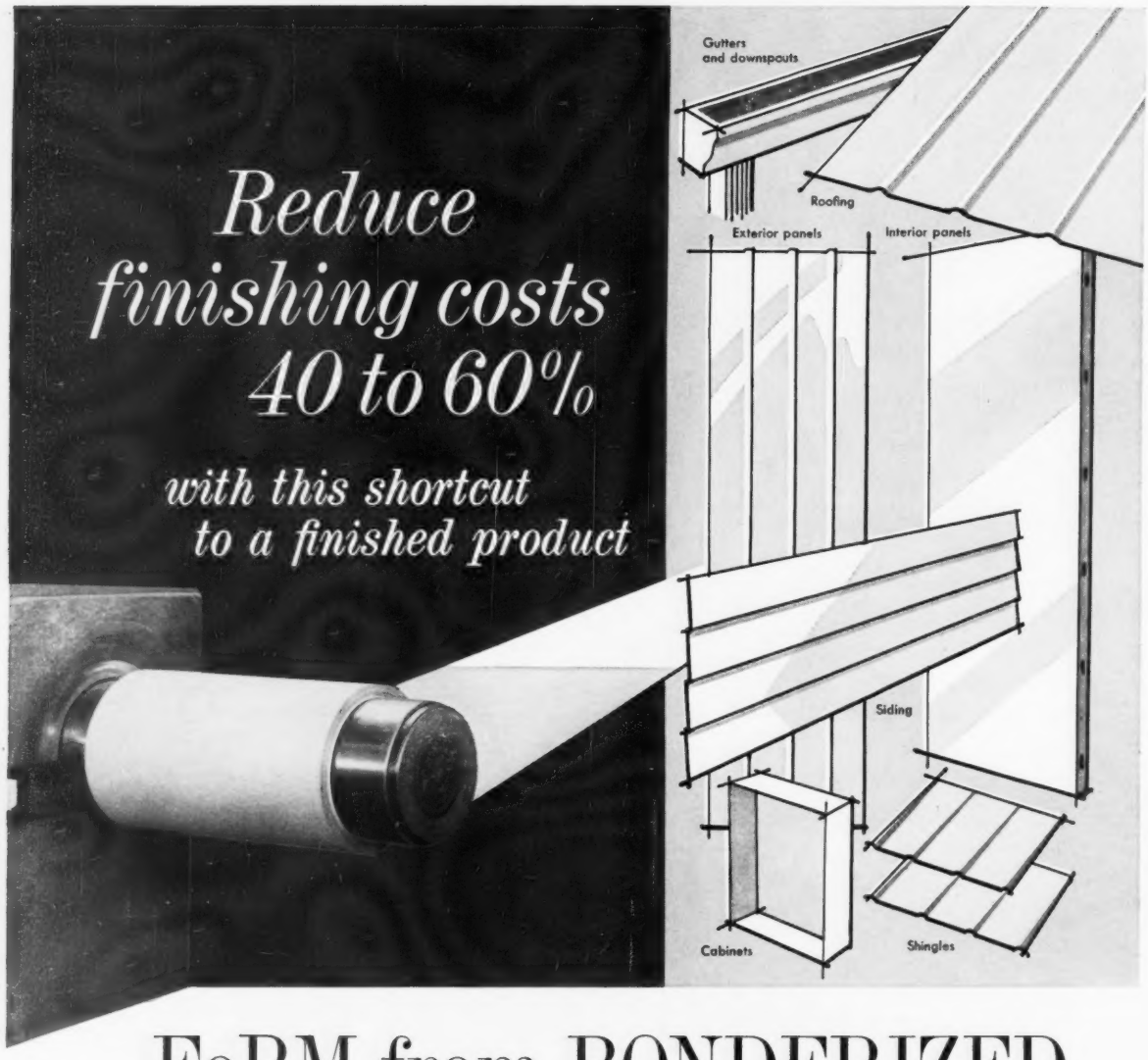


FoRM from BONDERIZED painted coil stock

Actual field experience and careful cost projections by manufacturers indicate that finishing costs can be cut 40 to 60% by using pre-painted coil stock. This is true for products formed from steel, aluminum or galvanized, using baked-on, high quality paints over Bonderite.

These spectacular savings result from decreased paint consumption and application costs per thousand square feet of surface.

Manufacturers of many types of products are taking advantage of these savings by using Bonderized, painted coil stock for their production now. Coil stock may be treated and painted in the plant, or purchased already Bonderized and painted, ready for forming and fabrication.

The Parker technical representative near you has full information on this revolutionary new way to reduce finishing costs. Or write to Parker, Detroit.

PROTECTED BY Bonderite PARKER RUST PROOF CO. QUALITY CORROSION RESISTANT

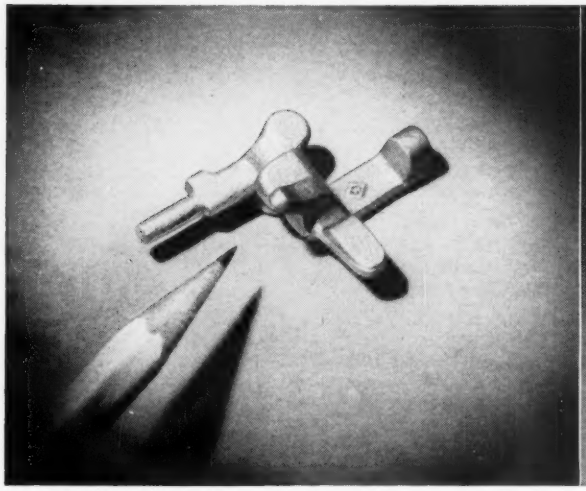
Parker Rust Proof Company
2158 E. MILWAUKEE, DETROIT 11, MICHIGAN

BONDERITE corrosion resistant paint base • BONDERITE and BONDERLUBE aids in cold forming of metals • PARCO COMPOUND rust resistant • PARCO LUBRITE—wear resistant for friction surfaces • TROPICAL—heavy duty maintenance paints since 1883

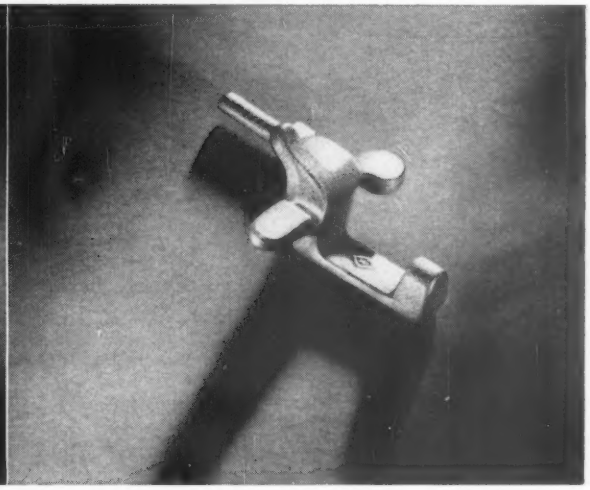
Since 1914—Leader in the field

*Bonderite, Bonderized, Bonderlube, Parco, Parco Lubrite—Reg. U.S. Pat. Off.

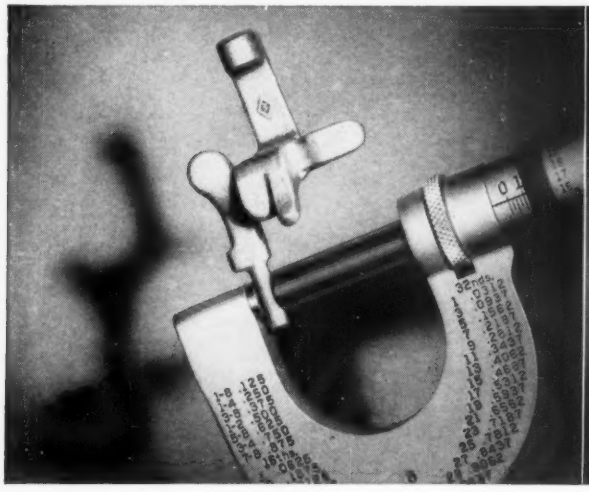
THIS INTRICATE FORGED PART WILL GIVE YOU NEW IDEAS . . .



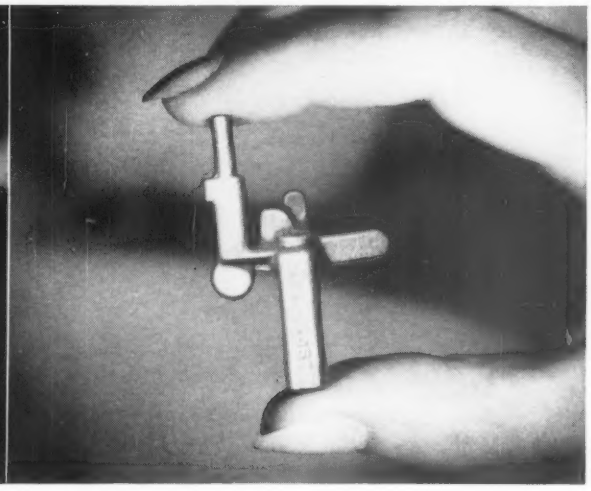
ON STRENGTH Insurance against equipment failure was the primary specification for this steel part for an electronic key punch machine. A Williams forging was selected to give the required strength and toughness for greatest dependability during high speed operations.



ON SHAPE The complicated contours of this part require controlled grain flow in many directions to provide maximum strength at points of greatest stress. Here the desired result was achieved by a parting line that is a complex intersection of 5 planes and 2 curved surfaces.



ON SIZE No part is too small for Williams. This part weighs only ½ ounce, yet Williams forging designers give the same attention to quality and cost of manufacture within close tolerances as they do to large forgings weighing up to 250 lbs.



ON FORGEABILITY Besides greater freedom of design, Williams forgings often result in fewer finishing operations, lower unit cost at point of assembly and dependability for years of heavy duty, in-service use. Let us help you determine the *forgeability* of your next part.

WILLIAMS PRECISION FORGINGS

FROM CARBON, ALLOY AND STAINLESS STEEL, MONEL, BRASS, BRONZE, COPPER, ALUMINUM ALLOYS AND TITANIUM.

J. H. WILLIAMS & CO.
DIVISION OF UNITED-GREENFIELD CORPORATION
406 VULCAN STREET • BUFFALO 7, N. Y.

Please send your new Forging Design Manual No. 60 which includes all necessary design data—tolerance tables, standard practices, specifications, etc.

NAME_____ TITLE_____

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Two new Durasafe models—

For greater protection . . . easier acceptance

Here are two new Durasafe safety glasses that will help make your eye safety programs *work*. Both give workers the type of protection they need, want, and will wear. The plastic and metal Safemaster (F5300) was designed for safety Rx as well as plano lenses. The Flexi-Fit (F9900), which fits 85-90% of plano users, helps you cut plant stocks of sizes, is also available for Rx. Both models give you major Durasafe features.

For better wearer acceptance and greater eye safety, check these durable new Durasafe models. Call your AO Safety Products Representative, or write for bulletin S-1524.

Only AO Durasafe gives you:

Sturdy frames—engineered for industrial use and exposures.

Wider temples, endpieces—stronger, more comfortable, better appearance.

7-Barrel hinges—40% stronger at temple's most vulnerable spot.

Duragrip screw construction—temples stay tight, screws cannot fall out.

Cool side shields—nonreflecting wire mesh.

Choice of temples—wide plastic comfort cable, metal core plastic spatula, or aluminum with plastic spatula tip.

Your Surest Protection . . . AO SURE-GUARD Glasses

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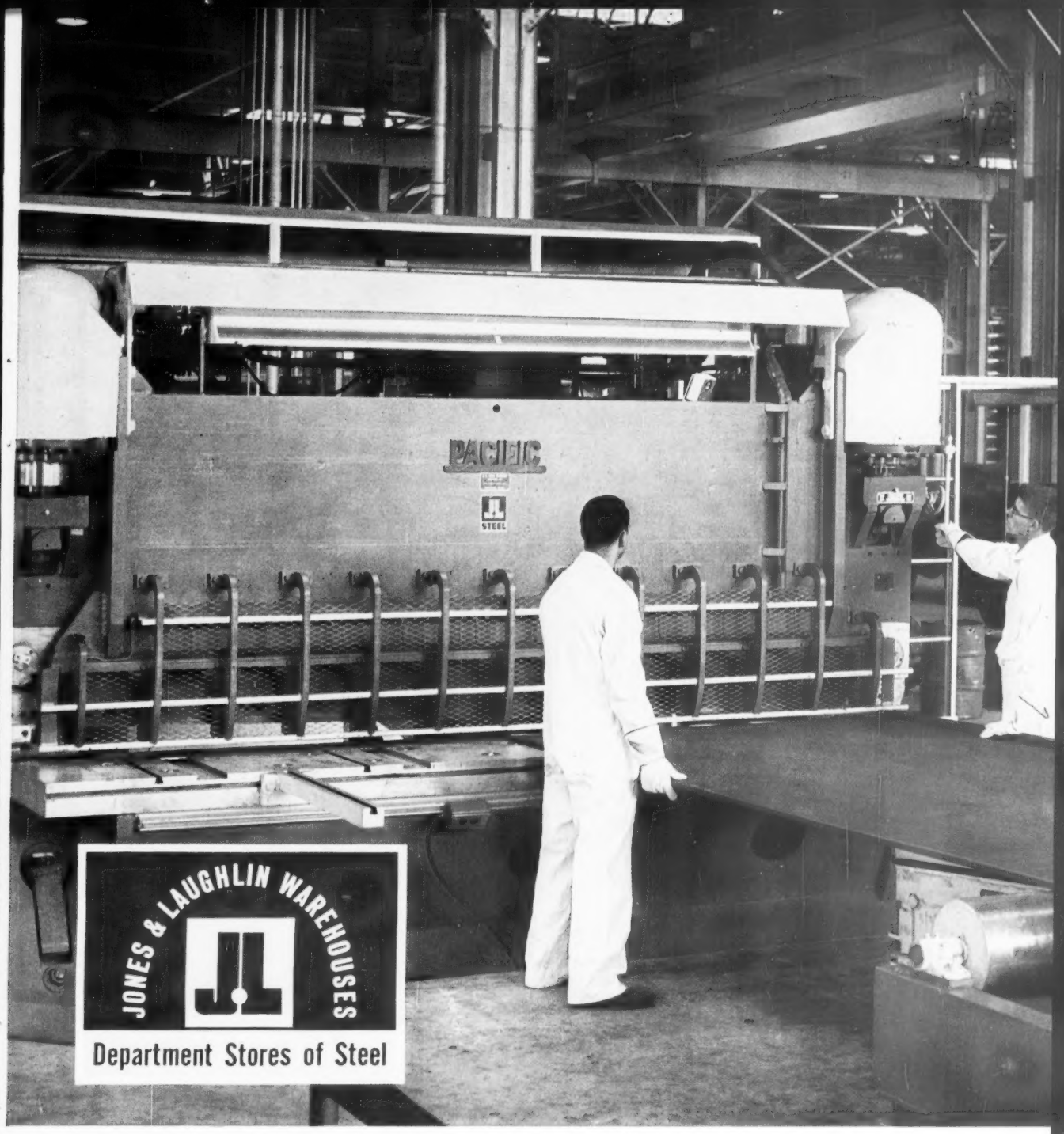
SAFETY PRODUCTS DIVISION • SOUTHBRIDGE, MASSACHUSETTS



J & L Steel Service Centers—efficient and dependable. You name it and you can get it—at the Department Stores of Steel. This massive 12 foot hydraulic shear, for example, cuts plate squarely and accurately up to ¾″ thick . . . to meet your exact specifications. Modern machinery like this, skilled warehousemen trained to give *extra* care to every order, plus ready-to-go stocks of carbon, stainless and specialty steels—all add up to faster, more efficient service for today's J & L customers.

Take advantage of the streamlined, time-saver service J & L offers. Count on the Department Stores of Steel. You'll get exactly what you want—when you want it.

J & L Steel Warehouse Division

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Select the Spring Action You Need–
A.S.C. Can Supply It!

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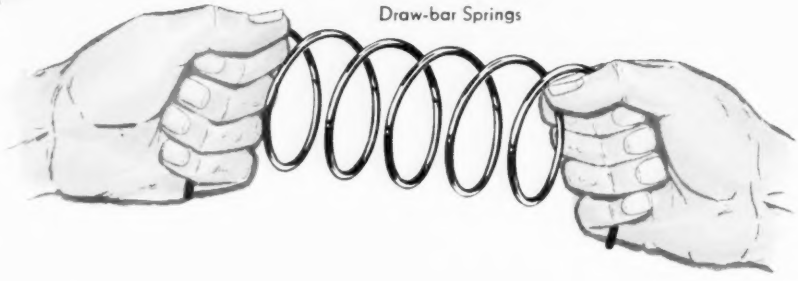
Spiral Torsion,
Flat Coil, Power,
Motor, Hairspring

PUSH
Compression Springs,
Belleville Springs,
Energy Cartridge

TWIST
Single and Double
Helical Torsion Springs,
Volute

CLAMP
Garter Springs,
Clips, Collars,
Rings, Retainers

PULL
Extension Springs,
Draw-bar Springs



PRESS
Flat Springs, Small Stampings,
Custom-made Fasteners,
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Whatever your spring requirements—small or large sizes and quantities—A.S.C. can meet them. Get a copy of this pocket guide to learn more about how Associated Spring can help you.

6100

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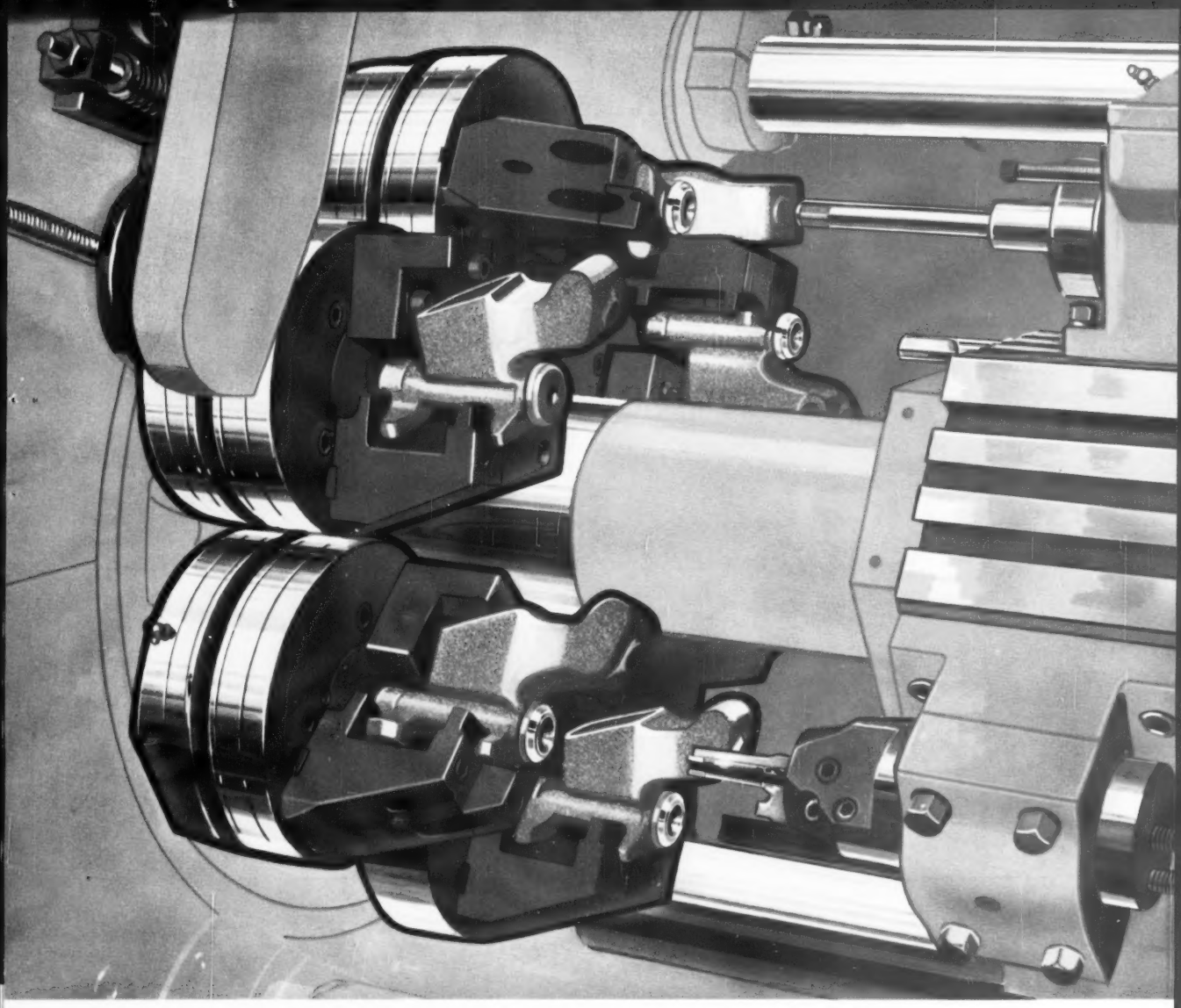
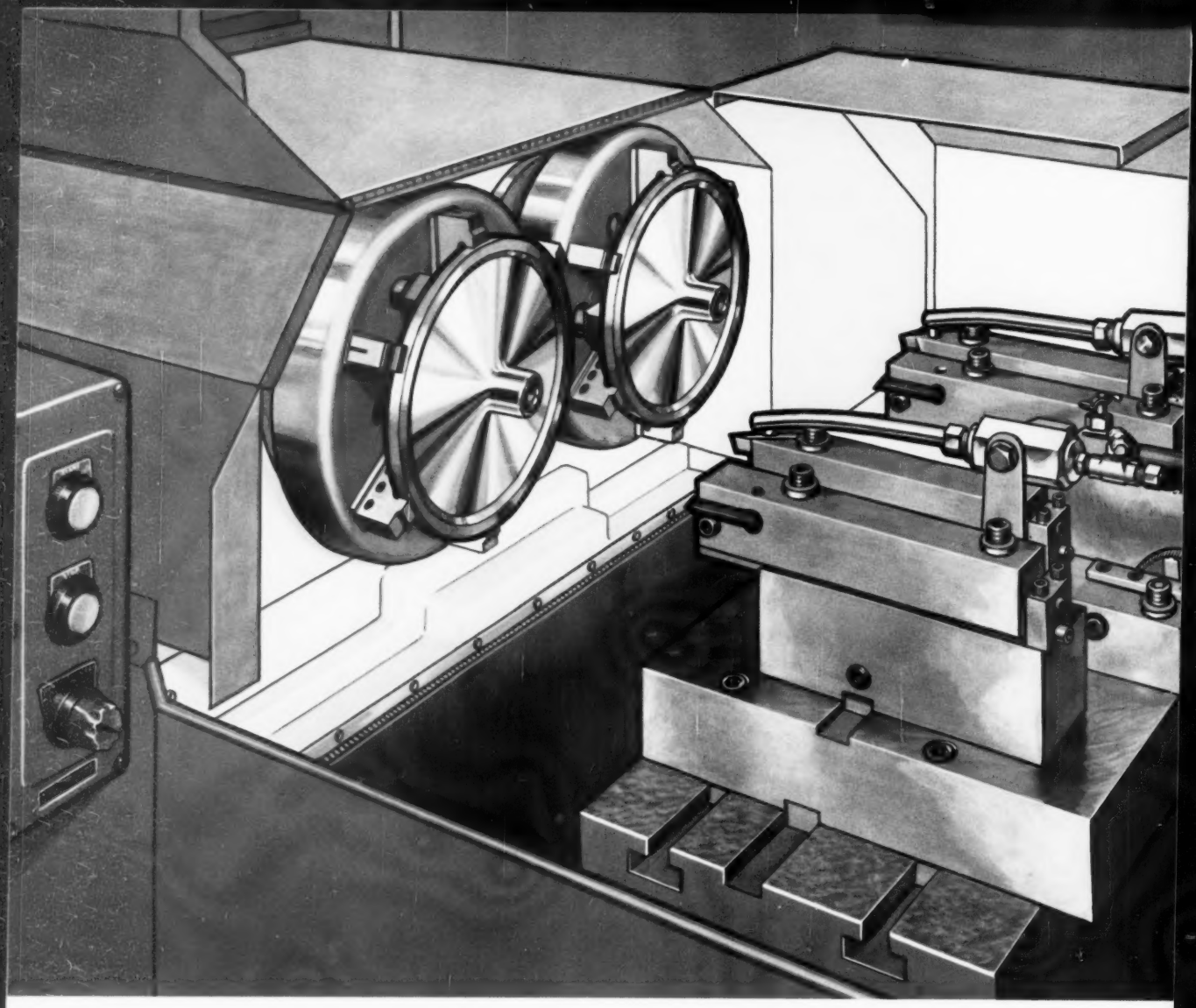


Odd shapes no problem
on New Britain Chuckers

The peculiar problems presented by odd shaped pieces are frequently as varied as the pieces themselves. The cut may be simple enough but the how and wherefore of chucking and swinging the piece may be something else again. New Britain Chuckers can handle the widest possible range of pieces—even odd shaped work. Open-end design which allows wide open accessibility to the tooling area makes the work easier to chuck, and easier to watch during the machining cycle. Because the work area is more open, this kind of work is easier to swing on a New Britain. This is one of many extras that are built into New Britain Chuckers. Another basic New Britain difference that pays off handsomely is the exclusive forming arm design which allows for the greatest possible variety of side cuts without special set-up. The combinations of end-working and forming cuts possible are practically unlimited. This flexibility of tooling coupled with big capacity lets New Britain users perform the widest possible variety of chucking machine work. Why not call in your New Britain representative?

THE NEW BRITAIN MACHINE COMPANY

New Britain-Gridley Machine Division ◆ New Britain, Connecticut



New Britain cam actuated *boring and contour turning*

Extreme accuracy, high productivity—even on complex contoured surfaces—these are the areas where New Britain's Vertical and Horizontal Precision Contour Turning and Boring Machines take the kinks out of production. Tool slides are cam actuated, generating contoured and straight surfaces, including sharp corners and exact radii. Time consuming wheel forming and dressing required by some methods of producing close tolerance, fine finish work are eliminated.

This is basic with New Britain and is a good part of the reason for the unbeatable repetitive accuracy of these machines. Both verticals and horizontals are simple to operate and simple in operating principle. Normally, gaging one dimension is sufficient. From one to four high speed spindles can be mounted on a single machine.

The widely accepted horizontals, or the completely new and revolutionary verticals with exclusive cam-in-head design, can be seen in action simply by contacting your New Britain representative. Whether you require one machine, several machines, the best approach to a building-block set-up, or whatever your precision contour turning or boring requirement may be, check with New Britain before you decide.

THE NEW BRITAIN MACHINE COMPANY

New Britain-Gridley Machine Division ◆ New Britain, Connecticut

Your real 'best buy' is the one that fits! *Vancoram Silicon Alloys*

If the Silicon product you use isn't *exactly* fitted to your needs, it is *not* your best buy, no matter how much of a bargain it seems. And because Silicon has so many different applications in the making of steel, it is not always easy to be sure that a particular grade is the one that will make for the lowest final costs.

This is just where your VCA representative can be of most help to you. From the comprehensive range of Vancoram Silicon products, he is able to recommend and supply the one most suited to your needs. Use clean and uniform Vancoram Silicon products with confidence—they're 'job-balanced' for economy and quality controlled all the way! Vanadium Corporation of America, 420 Lexington Avenue, New York 17, N.Y.
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VANADIUM
CORPORATION OF AMERICA
Producers of alloys, metals and chemicals

VANCORAM

HOUGHTON RUST PREVENTIVES

How many are "enough"?

A clean metal surface is an open invitation to *rust* or corrosion—easily the number one problem in metalworking. In 1869, *Cosmoline** was Houghton's single answer. Today, *Cosmoline* is still the answer. But Houghton now has many different *Cosmolines* and *Rust Vetos* to meet government and industry requirements: solvent-containing dry film, water displacing, non-solvents, fingerprint neutralizers and concentrates.

Since World War II, the trend in industry is toward lighter but stronger solvent-type coatings whose thicknesses are measured in thousandths of an inch. Among the dozens of Houghton solvent type preventives, the trend is also toward standardization on a minimum number of rust preventive compounds for general use. Leading in popularity are three *Rust Vetos* which can handle most industrial rust problems effectively.

Rust Veto 377 (indoor)

This is far and away Houghton's most outstanding preventive for long term indoor storage of open or packaged machine parts and equipment! It also provides excellent protection on phosphatized and blackened surfaces. It is a solvent-type compound that deposits a transparent film. Rust Veto 377 protects metal surfaces for up to a year, yet can be easily removed with a mild solvent.

One of its most important built-in properties is polar activity. Rust Veto 377 actually pushes water aside, gets under it and clings to the metal. You can even apply it to dripping wet surfaces and get complete protection from rust.

Economy is another important feature. Because it leaves only a .0003" thick film, Rust Veto 377 provides efficient protection of a much greater area than is possible with the thick, greasy preservatives. Used on all types of ferrous or non-ferrous metals, it is non-gumming, non-staining, compatible with lubricants, and sprayable to −40°.

This combination of properties makes Rust Veto 377 the ideal, across-the-board, indoor rust preventive for such products as hardware, bearings, razor blades, dies, tools, gauges, and idle or stored machinery.

Rust Veto 342 (outdoor)

For metals stored outdoors over long periods, new solvent type, Rust Veto 342 is an excellent general purpose preventive. When applied (dip, spray or brush) it forms a non-tacky, dry film that will not chip or crack. It protects metals from humidity, salt spray and weathering.

Two features make Rust Veto 342 unique among heavy duty rust preventives. (1) It provides heavy duty protection from rust for long periods, yet can be easily *removed* with only a solvent-soaked rag. (2) It deposits a *transparent* film. It will not obscure stamped numbers or coding on stored products and equipment.

Rust Veto MP (Multi-purpose)

This is an economical and versatile concentrate which can be diluted with water, oil or solvents, or used neat. It is good for indoor and limited outdoor protection of metal surfaces. Not intended for the same jobs as either 377 or 342, MP has a definite place in the rust prevention picture.

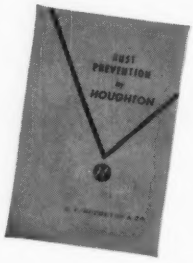
As the name indicates, it is a multiple purpose preventive concentrate. In undiluted form, MP is an oil type preservative that will protect metals during extended periods of indoor storage. Diluted with mineral oil it makes a slushing type rust preventive. Mixed with solvent it is a readily sprayable, water-displacing product. Diluted with water it is a fire-resistant, emulsion-type preventive. It is an effective fingerprint suppressor when diluted with a combination of water and solvent.

A Field for Specialists. No one, two or even twelve rust preventives can handle all rust problems. There is a definite need for thick, grease type preventives as well as special, spark plug varnish, aerosol sprays, wax coatings and others.

The trick is in having the parts properly cleaned (rust preventives will not work effectively on a dirty surface) and then selecting the fewest number of cleaners and rust preventives to do the most jobs, efficiently and economically. And only a specialist on both cleaning and rust prevention can help you arrive at the right answer. Why not ask your Houghton representative for a complete analysis of your requirements? Call him today or write E. F. Houghton & Co., 303 W. Lehigh Ave., Philadelphia 33, Pa.

New Rust Veto Spray has hundreds of uses in metalworking plants.

Brochure outlines major rust prevention problems and their solution. Write for your copy.



*Original Houghton TM, still used for Houghton government specification rust preventives.

Houghton

INDUSTRY'S PARTNER IN PRODUCTION

• MACHINES UP TO 50% FASTER
• LENGTHENS TOOL LIFE

Uniloy 303MA is a free machining grade of chromium-nickel stainless steel developed by Universal-Cyclops. It has been proven greatly superior to AISI Type 303 in key plants throughout the country.

Production tests have proved that Uniloy 303MA machines up to 50% faster than Type 303. Cutting tools last longer, decreasing tool cost and machine down time. Completed parts have a better finish than is possible with Type 303, and the corrosion resistance is far superior.

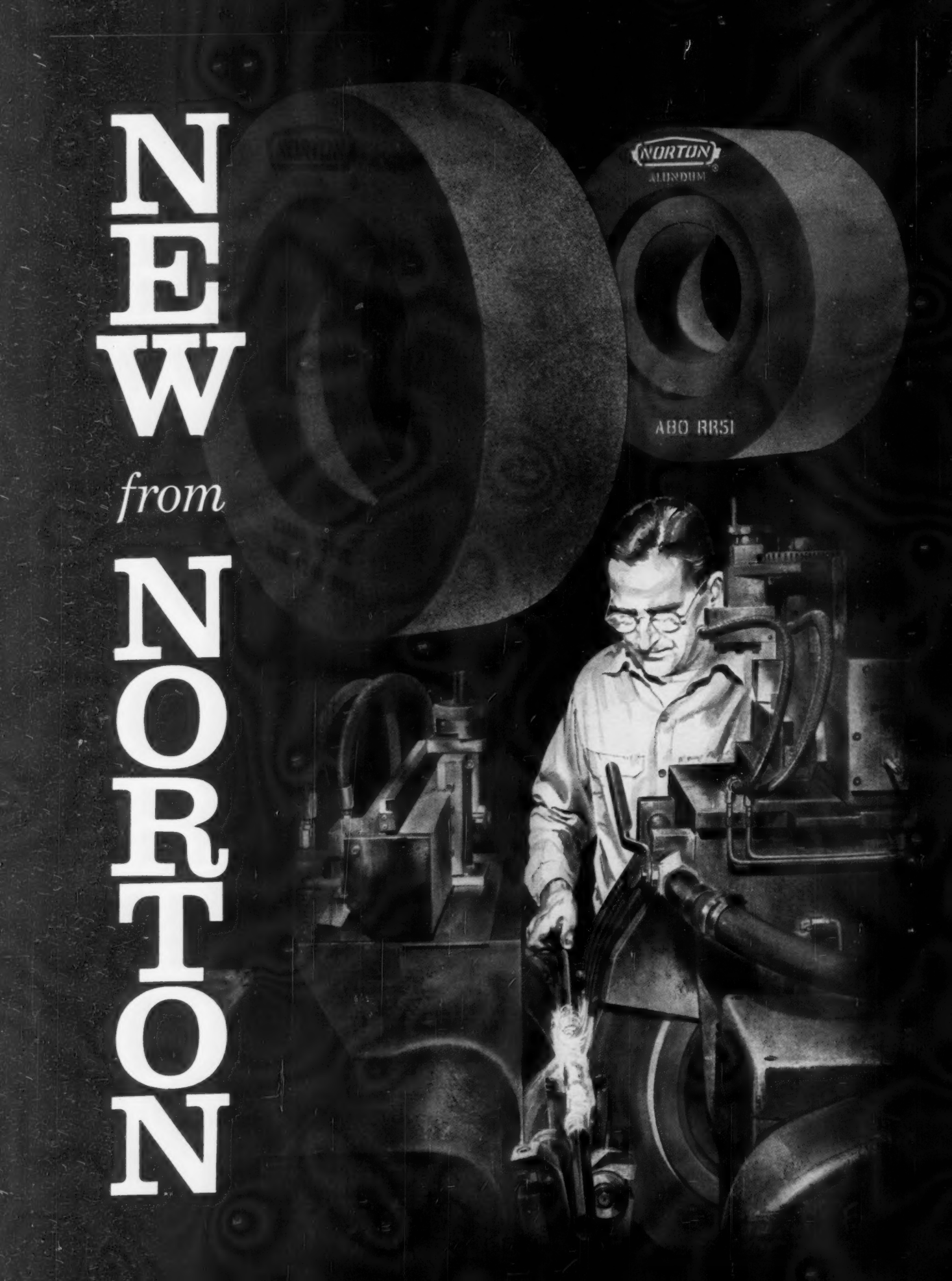
*Patent No. 2,900,250

Send for a copy of our new brochure containing complete data on Uniloy 303MA, and for Performance Reports citing dollar savings achieved by satisfied customers.

Contact your nearest Universal-Cyclops steel service center or sales office. Uniloy 303MA is AVAILABLE FOR IMMEDIATE DELIVERY.

UNIVERSAL CYCLOPS
UC STEEL
STEEL CORPORATION
EXECUTIVE OFFICES: BRIDGEVILLE, PA.

STAINLESS STEELS • TOOL STEELS • HIGH TEMPERATURE METALS


NEW
from
NORTON
NORTON
ALUNDUM
ABO RR51

The top-ranking wheel team for centerless grinding

The 23 ALUNDUM grinding wheel and R51 feed wheel . . . the best performing, longest lasting combination on any centerless grinder.*

Although centerless grinding is a two-wheel operation, it doesn't need to be a two-brand buying chore.

HERE'S WHY.

Norton now offers this outstanding wheel team for production-precision and economy in centerless grinding . . .

- *The 23 ALUNDUM grinding wheel for premium performance at non-premium price.*
- *The R51 bond feed wheel for positive feed and accurate work support plus long service life.*

23 ALUNDUM Abrasive is no ordinary aluminum oxide. In price it is *non*-premium . . . but with *premium* toughness and sharpness . . . and fast, free cutting action that means *premium* performance.

23 ALUNDUM wheels have other important advantages: friability, which minimizes dressing . . . uniform duplication, for uniform performance . . . and versatility, for grinding all steels, Meehanite, aluminum and many other metals.

Teammate R51 is not just another feed wheel. This special Norton abrasive-and-bond combination has thoroughly proved the importance of the feed wheel to accurate, low-cost centerless grinding.

Reports from plants all over the country credit R51 wheels with exceptional performance, minimum dressing and no slipping or chatter. And Norton quality control keeps them uniform from wheel to wheel and lot to lot.

On the new Norton No. 2 Straddle-Bearing Centerless Grinder — or on any other machine of this type — 23 ALUNDUM grinding wheels and R51 feed wheels make your best matched team for low cost, volume production centerless grinding. For expert aid in wheel selection, and a test run in your plant, see your Norton Man, a trained Abrasive Specialist, or your Norton Distributor, NORTON COMPANY, General Offices, Worcester 6, Massachusetts. Plants and distributors around the world.

*Trade Mark Reg. U.S. Pat. Off. and Foreign Countries

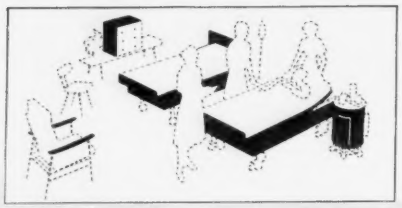
NORTON
ABRASIVES

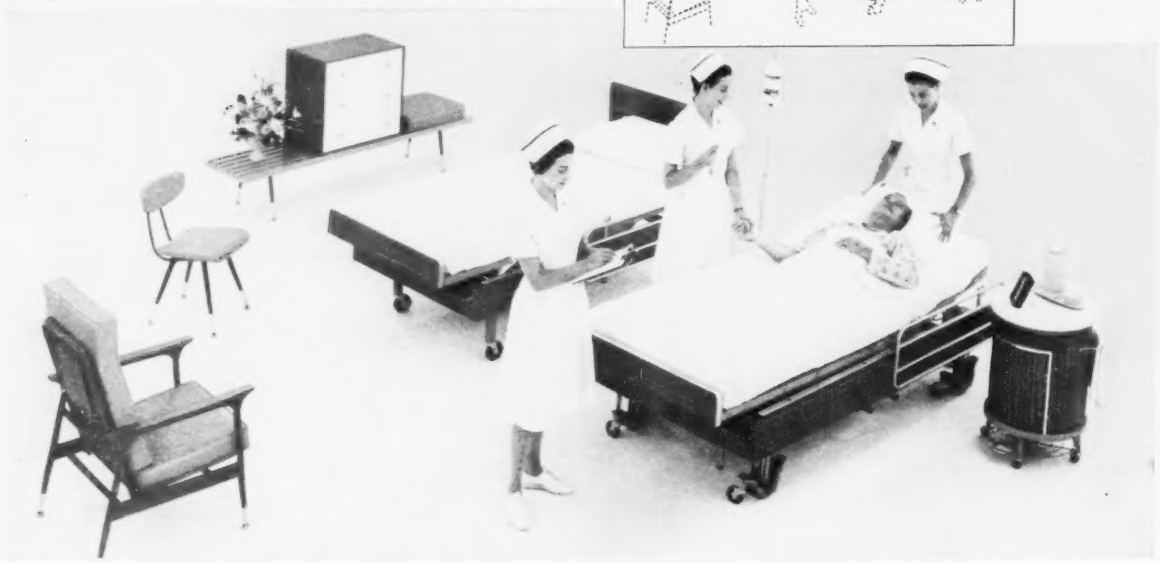
W-2011

Making better products . . . to make your products better

NORTON PRODUCTS: Abrasives • Grinding Wheels • Machine Tools • Refractories • Non-Slip Floors — **BEHR-MANNING DIVISION:** Coated Abrasives • Sharpening Stones • Pressure-Sensitive Tapes

CLAD-REX VINYL-CLAD METAL USED IN HOSPITAL FURNITURE





Clad-Rex vinyl-clad metal can add to the sales appeal and profit of <u>your</u> product, too!

"Our new line is the greatest advance in patient-room furniture in hospital history", says American Seating of Grand Rapids, Michigan. "Two years of research, development and testing were put into these new products." They are made with Clad-Rex vinyl-clad metal, because it has unusual sales appeal as well as special corrosion and abrasion resistance. Fabrication, according to American Seating, is much the same as with bare sheet metal—except for finishing, which is not needed!

See how Clad-Rex vinyl-clad metals can help your product by contacting Simoniz Industrial Products, 11504 West King Street, Franklin Park, Illinois (Phone Gladstone 1-2323). Ask for Report 6101, "How to Use Vinyl-Clad Metal in Commercial Furniture".

25B

Clad-Rex Vinyl-Clad Metal is a product of

RESEARCH • DEVELOPMENT • ENGINEERING

SIMONIZ INDUSTRIAL PRODUCTS

A Division of Simoniz Company

CLAD-REX VINYL-CLAD METALS • **SIMONAIRE** FOAMS AND INDUSTRIAL CHEMICALS
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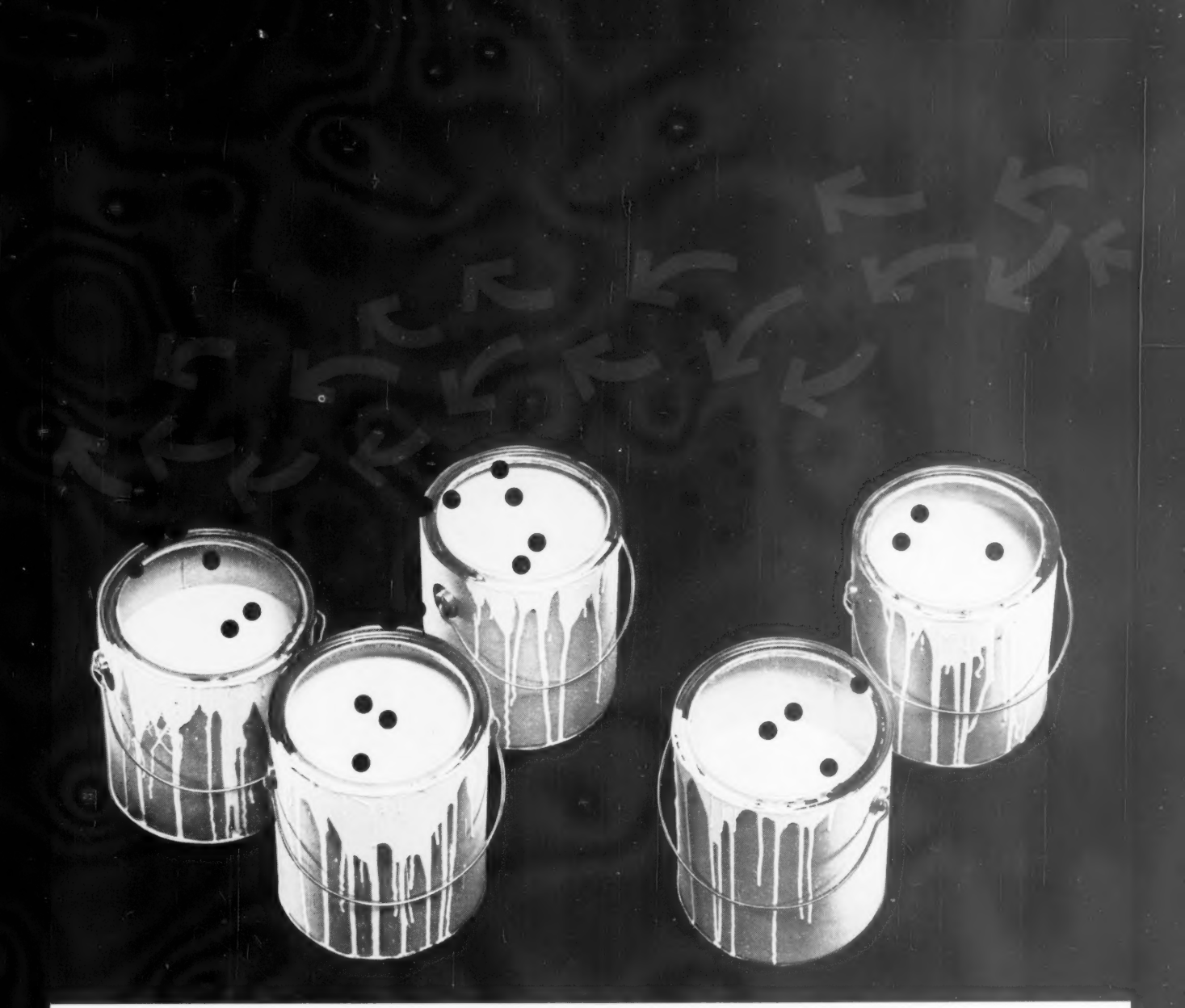

Problem: Paint jobs ruined by airborne dirt in spray booth

This plant needs make-up air! If the exhaust fans in your paint shop remove air faster than you replace it, they cause a vacuum. The vacuum sucks in dirt and dust every time a door or window is opened. Your plant needs make-up air...a supply of new air to replace exhausted air and cancel out vacuum.

Without make-up air, you get a chain reaction of vacuum problems. Violent cross drafts...Infiltration of dirty air or fumes from outside, and from one plant section to another ...Heat loss...Unhealthy workers... Low morale...Costly absenteeism.

Solution: install separate fans to supply make-up air. They cancel out the vacuum, give your plant balanced ventilation. These fans should be part of a complete make-up air system that tempers and cleans the incoming air.

For technical help on make-up air, see your Consulting Engineer. Or call in Sturtevant application engineers. They're experts in handling air...whether you want to move it, heat, cool or clean it. Mail coupon for booklet on make-up air. J-80709

WESTINGHOUSE ELECTRIC CORPORATION
Sturtevant Division, Dept. ES09.
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You can be sure...if it's **Westinghouse**

Free your roll shops for redressing and leave the finishing to us

Is roll finishing straining the profitability of your roll shop operations? Many roll users have lowered operating costs by ordering finished rolls from National, leaving their shop facilities for redressing. They've found National's modern, fully equipped roll shop economically meets all requirements for precision finishing of plain or grooved rolls. They know experienced men such as sales representatives John Patton and Bill Mason, pictured above, shoulder the responsibility for roll quality from "spec" to finishing. On your next order for steel, iron or nodular iron rolls order them finished by National. You'll see why . . . NATIONAL'S THE GROWING NAME IN ROLLS.

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GENERAL STEEL INDUSTRIES, INC., Avonmore, Pennsylvania
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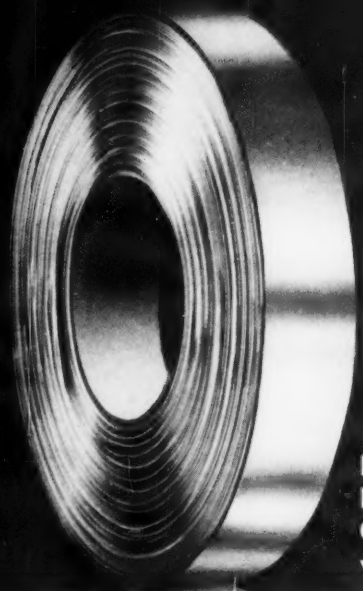
Subsidiary: St. Louis Car Company, St. Louis, Mo.

COLORKOTE®

By ENAMEL PRODUCTS & PLATING CO.



available in pre-enameled steel and aluminum coil in widths up to 60" wide

If you can Form it, Stamp it or Draw it you can MAKE IT WITH COLORKOTE... the coated metal with a million uses from . . .

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If your product is not listed here, inquire: Enamel Products & Plating Company's experienced industrial engineers and product designers are at your service to help apply **COLORKOTE** to your product.

Ash trays to skyscrapers

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Furniture for home, office, hospital
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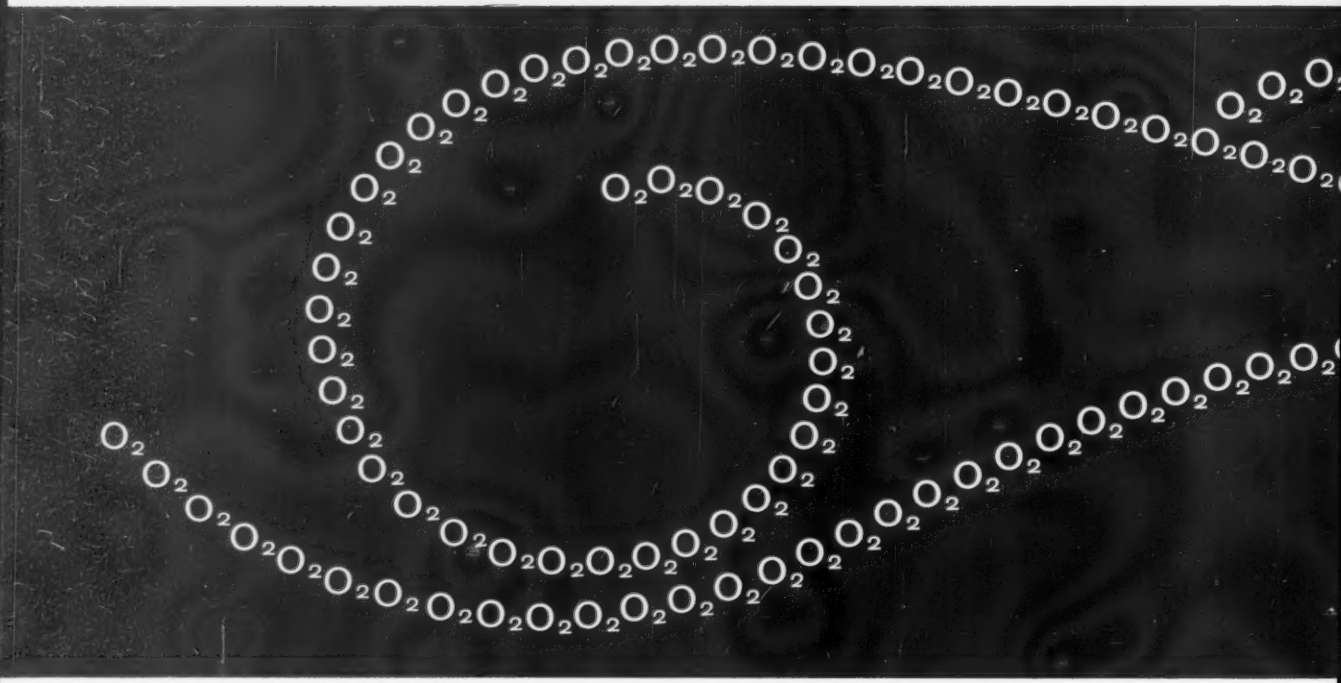
OXYGEN FOR STEEL IS ALWAYS ON TAP WHEN

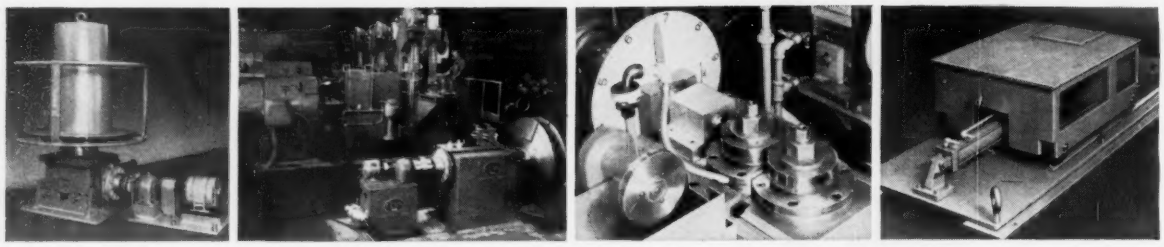


Your oxygen supply, piped from a plant we build and operate, on or adjacent to your site, is backed by 45 years of experience in air separation. We have the resources and sound engineering ability to keep your

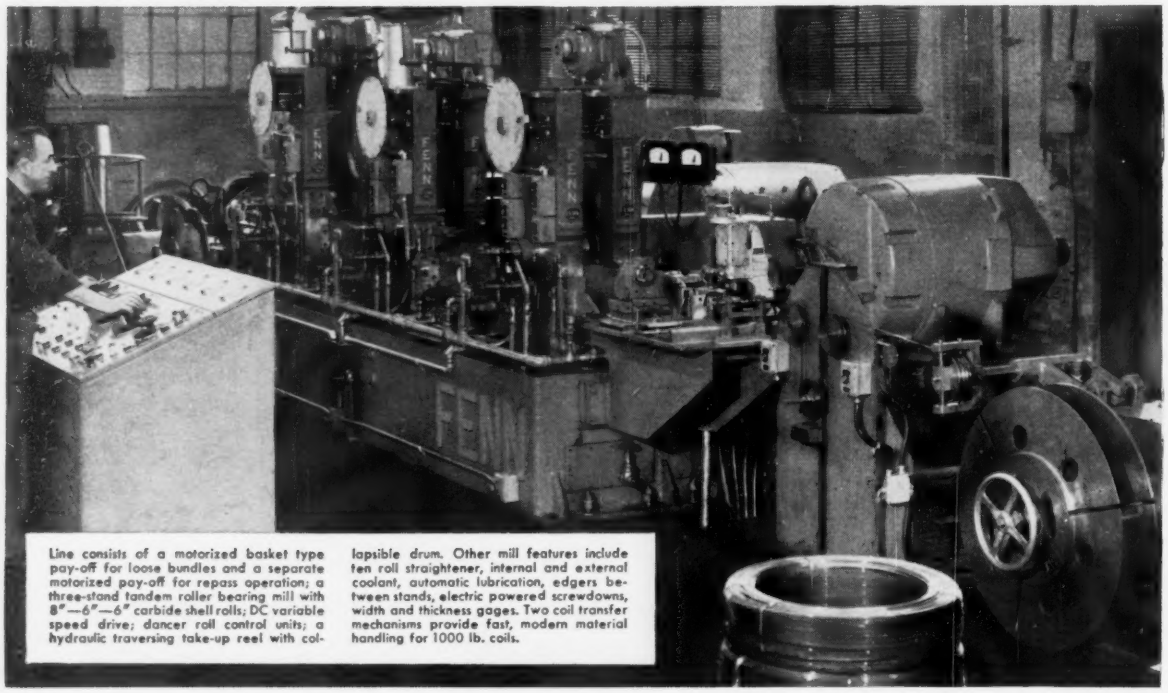
oxygen flowing now and as your needs increase. For the full oxygen story, phone, write, or wire Airco.

AIRCO **AIR REDUCTION SALES COMPANY**

A DIVISION OF AIR REDUCTION COMPANY, INCORPORATED, 150 EAST 42ND STREET, NEW YORK 17, N. Y.
REPRESENTED ON THE WEST COAST BY AIR REDUCTION PACIFIC COMPANY



PRODUCING SPRING STEEL FLATS AT 3100 FPM



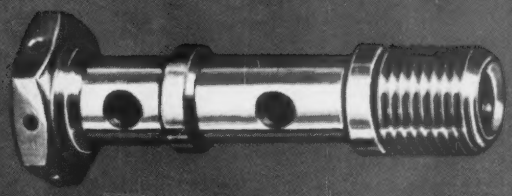
Line consists of a motorized basket type pay-off for loose bundles and a separate motorized pay-off for repass operation; a three-stand tandem roller bearing mill with 8"—6"—6" carbide shell rolls; DC variable speed drive; dancer roll control units; a hydraulic traversing take-up reel with collapsible drum. Other mill features include ten roll straightener, internal and external coolant, automatic lubrication, edgers between stands, electric powered screwdowns, width and thickness gages. Two coil transfer mechanisms provide fast, modern material handling for 1000 lb. coils.

pace-setting precision wire flattening mill

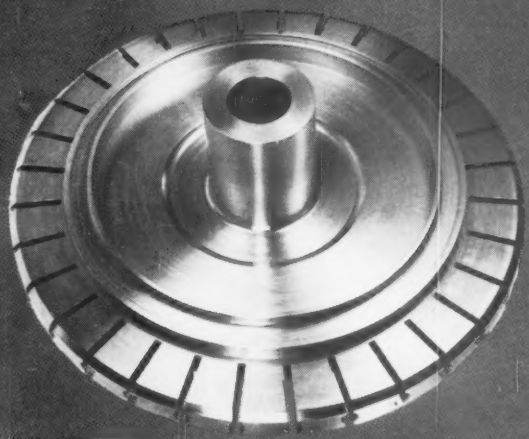
This three-stand tandem mill represents the finest in high speed precision wire flattening equipment. Installed at one of the nation's largest producers of spring steel, it offers significant advantages in flexibility, customer service, and finer stock finish. Production is greatly simplified with special material handling accessories, and the ability to produce flats from starting rounds entirely eliminates the customary slitting operation. Perhaps, like this progressive manufacturer, the time is at hand to evaluate your wire flattening equipment in terms of the economic justification for modernizing to the standards set by Fenn mills. Fenn's long experience is at your service. Fenn engineers will study your specific requirements and make recommendations for equipment to your competitive needs. The Fenn Manufacturing Company, Fenn Road, Newington, Connecticut.

Designed and Built by FENN

you can drill it...



you can machine it...



you can head it...

but you can never, no never, change its consistent uniformity!

...your first order will convince you—Carpenter Specialty Stainless is easier to fabricate. Made by one of the leading producers of stainless steels for industry, Carpenter Specialty Stainless assures greater output, fewer rejects and increased profits.

***Carpenter* steel**

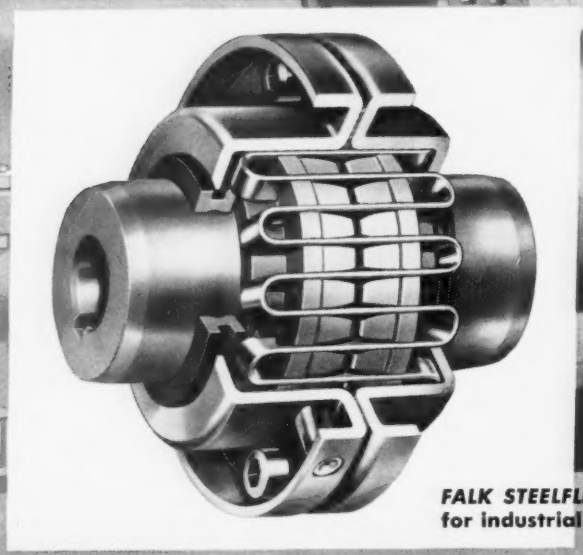
you can do it ***consistently*** better with Carpenter Stainless Steels for specialists

Stainless Steel

The Carpenter Steel Company, Main Office and Mills, Reading, Pa.
Alloy Tube Division, Union, N. J.
Webb Wire Division, New Brunswick, N. J.
Carpenter Steel of New England, Inc., Bridgeport, Conn.

FALK

A GOOD NAME IN INDUSTRY



FALK STEELFLEX COUPLINGS
for industrial applications...large or small

Giant Falk Coupling smooths out steel blooming mill performance

On a blooming mill at the Copperweld Steel Company plant in Warren, Ohio, installation of a large Falk Steelflex coupling between motor and pinion stand eliminated troublesome noise and vibration which threatened to damage mill machinery. Transmitting 5,000 hp at 50/100 rpm, this is not the largest Falk coupling... others are designed to transmit up to 130,000 hp at 100 rpm.

This installation and others like it prove the Falk concept of shaft coupling design—namely, a modern shaft coupling must contribute to the successful performance of the machinery system.

What does this mean to you? Just this: On large machines as well as small, the exclusive Falk grid-groove design does make a difference, and the difference is torsional resiliency with the strength of steel...reason enough to specify Falk Steelflex couplings as "long life" insurance for your connected machinery.

Falk Steelflex couplings are available in standard designs in 34 sizes for applications from .3 hp at 100 rpm to 130,000 hp at 100 rpm, with excellent delivery. Write for Bulletin 4100.

THE FALK CORPORATION, MILWAUKEE 1, WISCONSIN

MANUFACTURERS OF QUALITY GEAR DRIVES AND FLEXIBLE SHAFT COUPLINGS

Representatives and Distributors in most principal cities

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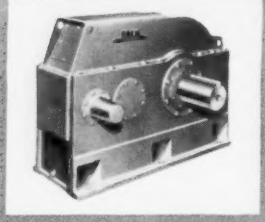
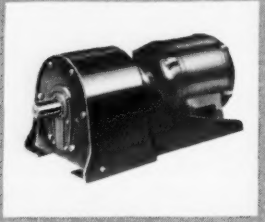
A Point to Ponder... When you need gear drives or shaft couplings of "FALK OR EQUAL" quality, where but from Falk can you get the "OR EQUAL"?

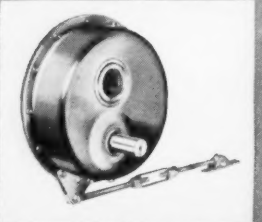
Other members of America's First Family of Power Transmission Products



SPEED REDUCERS
Parallel Shaft up to 3500 hp. Ask for Bulletin 1100. Also Right Angle and Concentric Shaft designs.



ALL-STEEL MOTOREDUCERS
—up to 75 hp. Horizontal, Vertical, and Right Angle. All-Motor and Integral Types. Ask for Bulletin 3100.



SHAFT MOUNTED DRIVES
—up to 125 hp. Ask for Bulletin 7100. Also Flange Mounted and Screw Conveyor Drives.

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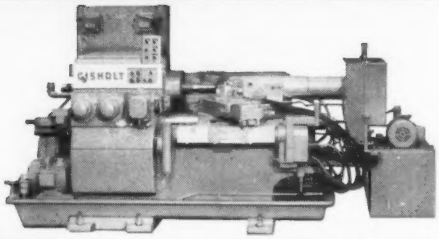
SOMEBODY *is doing it for* LESS



MASTERLINE® NO. 12 Automatic Chucking Lathe—horizontal model shown . . . vertical model is also offered, in addition to a larger, No. 24 Lathe.

As practical for small lots as large production runs.

All three feature rugged construction, ease of control and fast setup. Single- or multiple-pass JETracing (shown) can be part of the automatic cycle for lower tool costs, even faster setup, minimum inspection and increased versatility of the basic machine.

Call your Gisholt Representative or write for Catalog 1213.

Post-mortems on lost orders can be profitable —if you act after the facts are known.

The savings offered by recent developments in Gisholt Automatics may surprise you.

New, faster setup methods up profits on smaller runs. Tracers cut tool costs and handle more complex work. Speed, capacity and horsepower is up . . . for maximum production with carbides.

Act now. Find out how Gisholt Automatics can help you do it for less!

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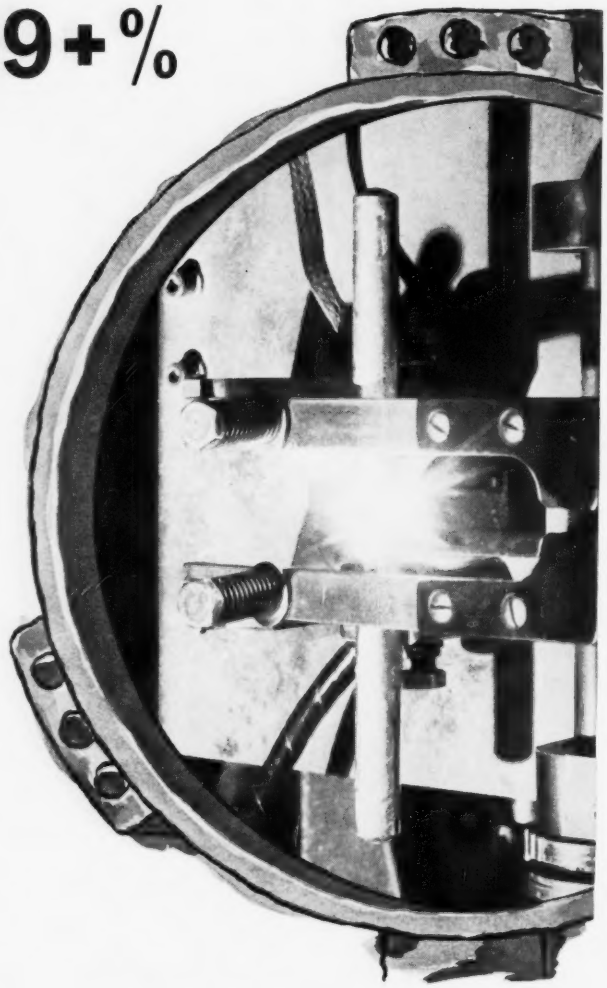
MACHINE COMPANY
Madison 10, Wisconsin, U.S.A.

Turret Lathes • Automatic Lathes • Balancers • Superfinishers® • Threading Lathes • Factory-Rebuilt Machines with New-Machine Guarantee

22,500 VOLT "SEARCHLIGHT" Constantly Watches

ST. JOE 99.99+% ZINC QUALITY



A blazing high voltage arc which illumines the composition of metal is part of the modern scientific equipment St. Joe uses to insure unvarying zinc purity.

Samples of every heat of St. Joe zinc are analyzed by the Direct Reading Spectrometer. The samples are placed in the Spectrometer electrode holders and the extremely high voltage creates an arc between them. As elements are vaporized, light from the arc is broken into element lines of varying light energy.

This energy, directed to photomultipliers (photosensitive electronic tubes), is converted to electrical energy which actuates precalibrated dials (see photo) that indicate elements directly IN PERCENTAGES! In five minutes the zinc sample can be completely analyzed for iron, lead, cadmium, copper, aluminum, indium, tin, antimony, silicon and magnesium. Two minutes later, casting room operators know whether or not they are holding critical purity specifications.

Stringent, continuous quality control backed by St. Joe's reputation as a supplier of quality metal is your assurance of consistent die casting results from St. Joe 99.99+% zinc.

ST. JOSEPH LEAD CO.

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ST. JOE 99.99+% ZINC

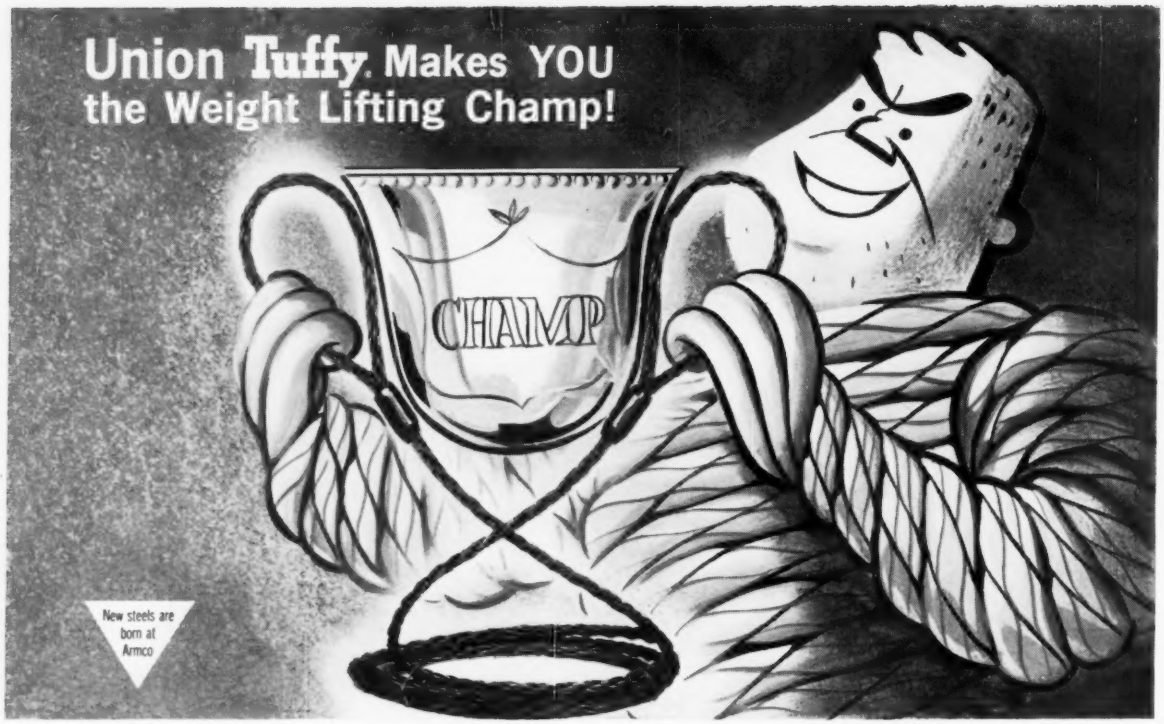
ZN-190

HERE!

ADD UP TO 4% TO YOUR NET PROFIT

Caught in a profit squeeze? The contents of the Texaco man's briefcase can help you do something about it. Inside is Texaco's "Stop Loss" Program. It's a new cost control tool that can knock as much as 15% off your maintenance costs by showing you how to organize your lubrication. You can tack this saving directly onto profit—for an average 4% net gain. It will pay you to get the details. Write for our folder "How to Starve a Scrap Pile." TEXACO INC., 135 East 42nd Street, New York 17, N. Y. Dept. S-182

TEXACO



Hercules, Paul Bunyan, Big John Henry—pick any strong man you like, real or legendary. You and Union Tuffy can outlift him and never strain a muscle. You see, Union Tuffy slings have sinews of braided steel. Machine-braided wire fabric construction, a Union Tuffy exclusive, gives you great flexibility for safer, easier handling and resistance to kinking. Even if a Tuffy Sling gets a kink, it's quickly taken out without material damage to the wire fabric. Specify, yes insist, on the balanced power of Union Tuffy Slings and Union Wire Rope Tuffy Hoist Lines.

More Special Union Wire Slings

In addition to famed Union Tuffy Slings, Union Wire Rope offers, in a full range of sizes:

1. **Hand Braided** six and eight-part slings.
2. **Uni-ply**—a flexible multi-part rope laid sling with pressed-on metal ferrule.
3. **Press-Grip** wire rope sling with pressed-on metal ferrule.
4. **Uni-Grip** wire rope sling with return loop splice and pressed-on metal ferrule.

Union Wire Rope Tuffy Tips on safe use of Slings and Hoists

Professional Weight Lifters Work the Safety Angles

Here's a tip that could save an injury and absenteeism. The weight lifter's secret is proper leverage. The weight lifter never leans over to pick up the load. He squats down as near as possible to it, and keeps his back erect. Lifting action comes from legs and thighs. If you must use muscle for lighter lifting jobs, these points are worth remembering. But wherever possible — and always for heavy loads—use hoists and slings.

Free! Two Valuable Tuffy Handbooks

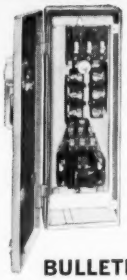
1. "Tuffy Tips." Many more safety hints. Tells how to break in wire ropes and slings; lubrication and inspection procedures. Do's and don't's to save money, assure better service.

2. "Tuffy Sling Handbook." Helpful data on the selection of slings for different jobs—types, dimensions, weights, fittings, rated loads, safety-approved signals.

3-61

BOTH FREE! Write Union Wire Rope, Armco Steel Corporation, 2160 Manchester Ave., Kansas City 26, Missouri

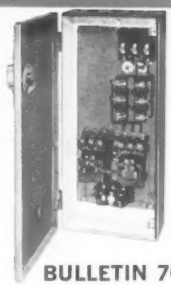
ARMCO Union Wire Rope



BULLETIN 712
Size 1 combination starter with fused disconnect switch

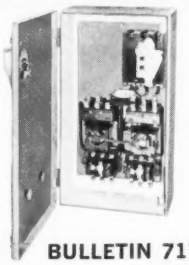
BULLETIN 713
Size 1 combination starter with circuit breaker

BULLETIN 705
Size 2 across-the-line reversing starter with overload relays



BULLETIN 706
Size 1 reversing starter with fused disconnect switch

BULLETIN 715
Size 1 across-the-line, multi-speed starter with overload relays



BULLETIN 717
Size 2 multi-speed starter with circuit breaker

BULLETIN 702
Size 3 three-pole, a-c solenoid contactor

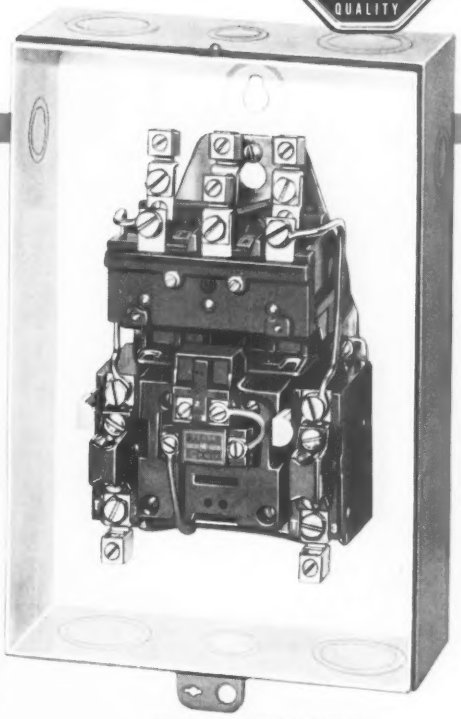
Pygmies in Size
Giants in Performance—
the NEW Allen-Bradley Across-the-Line Starters!

This new line of across-the-line motor starters is the result of over 30 years of experience and leadership in the motor control field.

While retaining the simple solenoid principle—with only ONE moving part—these starters are completely new in every way. They are amazingly small in size—yet test after test has proved they will not only outperform but also outlast any starter now on the market. They are good for *many millions* of trouble free operations. All have scores of design refinements that make them easier to install and maintain. All are available in the smart new enclosures designed by Brooks Stevens. They make a beautiful addition to any machine or control installation.

You'll want to get the complete story about these truly revolutionary new across-the-line starters. Write for new Publication 6100.

A-B QUALITY



BULLETIN 709

This popular across-the-line solenoid starter shows the new Size 2 construction. Note the white interior and generous wiring space. Bulletin 709 starters are available, in the new construction, in seven sizes—Sizes 00 to 5, with a maximum rating of 100 hp, 220 v; 200 hp, 440-550 v.

11-61-RM

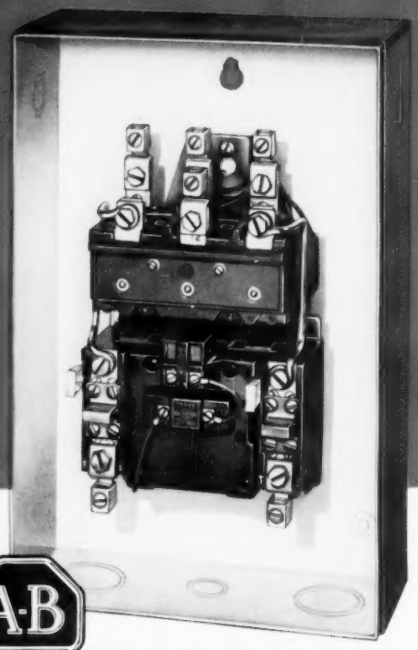
ALLEN-BRADLEY

Member of NEMA

Allen-Bradley Co., 1316 S. Second St., Milwaukee 4, Wis.

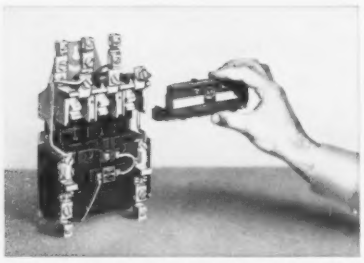
QUALITY MOTOR CONTROL

Features of the NEW Allen-Bradley starter line that are of value to you!

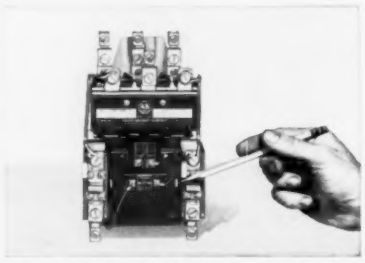


New Bulletin 709 Size 3 across-the-line motor starter. Note the generous space for wiring, accessible terminals, and white interior.

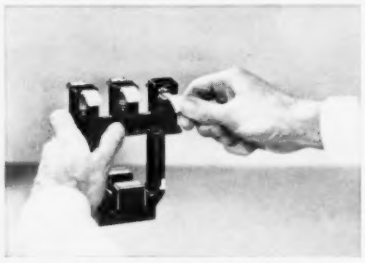
Every detail of the new Allen-Bradley motor starters has been designed to help make this the best line of motor control on the market. Remarkably small in size, each starter is a giant in performance. Being light in weight, these starters are easy to handle and a cinch to install. The generous wiring space, full front wiring, white interiors, and convenient knockouts make installation easy. The enclosure cover is firmly held with a quarter-turn fastener. All installation, inspection, and maintenance operations can be handled from the front—as shown in the illustrations below—without the use of special tools.



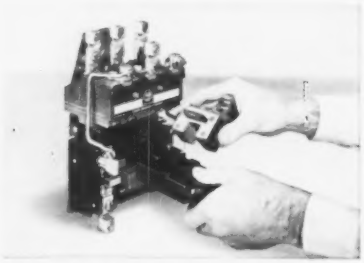
QUICK, EASY CONTACT INSPECTION—When the arc hood front cover is removed by loosening two captive screws, contacts are plainly visible from the front.



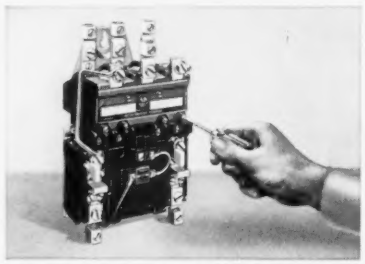
CONTACT POSITION INDICATED—Two slots in the coil cover show the position of the movable contact support—tell whether contacts are "closed" or "open."



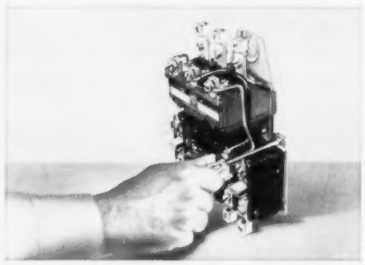
CONTACTS EASILY REPLACED—Depress the spring slightly, and the movable contacts can be lifted out of the molded support and the new contacts slipped in.



COIL EASILY CHANGED—When the coil cover is removed, coil and magnet yoke can be lifted out from the front. They are impossible to replace incorrectly.



AUXILIARY CONTACTS EASILY ADDED to the front of the starter. Two extra auxiliaries can be added to Sizes 0, 1, and 2 starters, and four, to Sizes 3, 4, and 5.



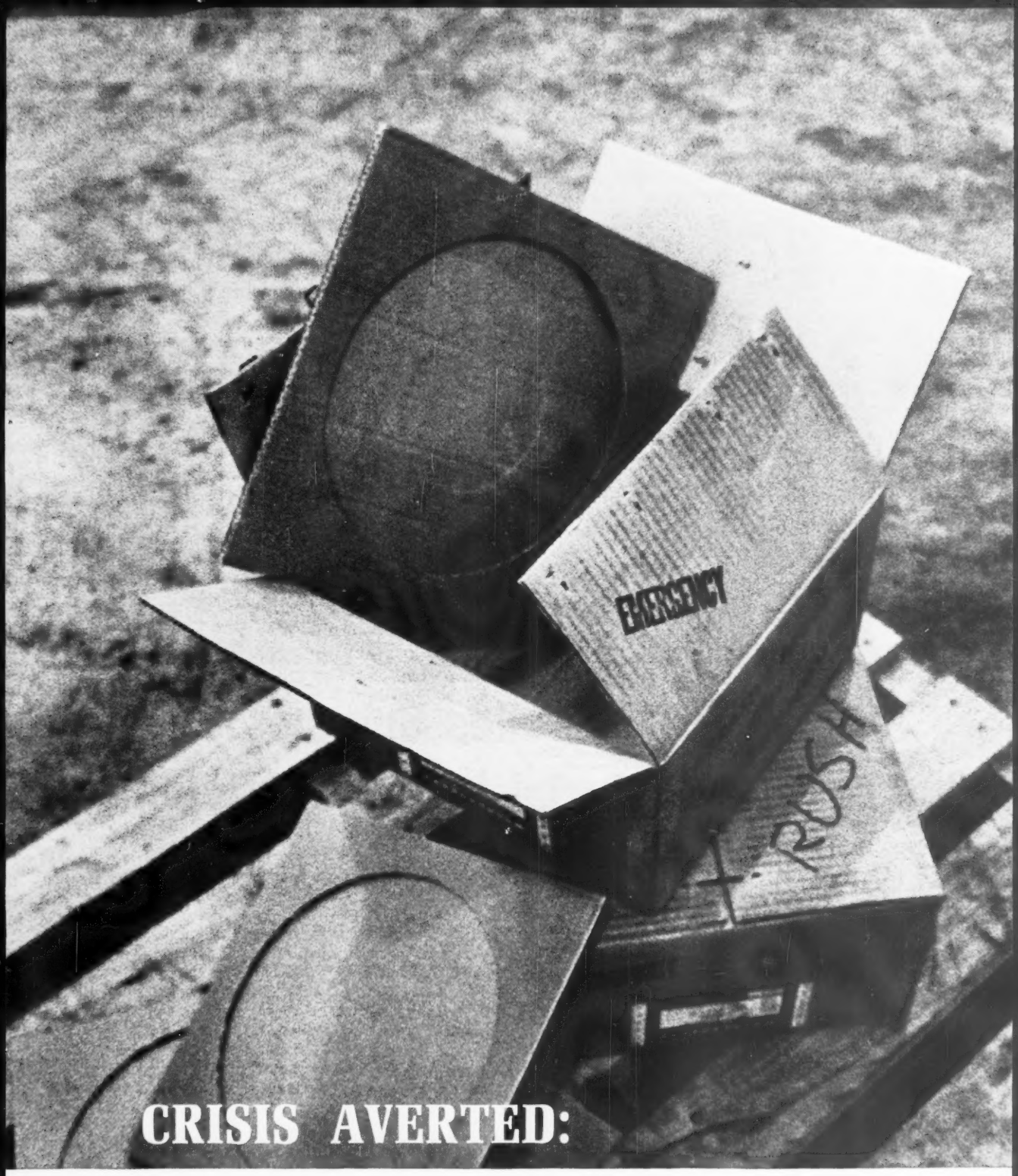
A THIRD OVERLOAD RELAY CAN BE EASILY ADDED in the field, from the front of the starter. And the only tool needed is a common screwdriver.

ALLEN-BRADLEY

Member of NEMA

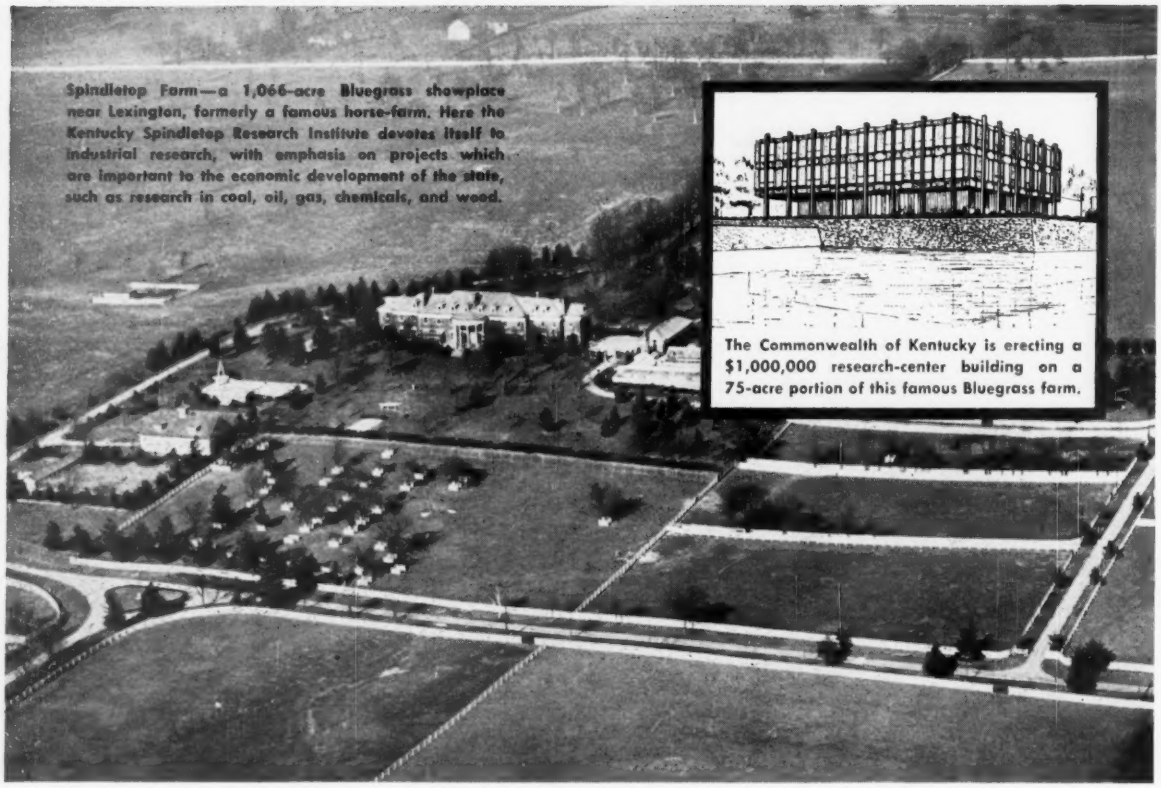
Allen-Bradley Co., 1316 S. Second St., Milwaukee 4, Wis.

QUALITY MOTOR CONTROL



CRISIS AVERTED:

Not every grinding wheel order springs from an industrial crisis, but when there *is* a hands-down emergency—when you're in a cross-fire of urgent demand that only an opened container on your shipping dock can satisfy—Carborundum's electronic order processing service can be your answer. By split-second Univac II control, Carborundum can instantly search a nationwide chain of warehouses for the item you need—place it under teletype order for air shipment—slam the door in the face of crisis. For your critical items . . . as for your everyday requirements . . . Carborundum is your key to superior abrasive service. **CARBORUNDUM**


Spindletop Farm—a 1,066-acre Bluegrass showplace near Lexington, formerly a famous horse-farm. Here the Kentucky Spindletop Research Institute devotes itself to industrial research, with emphasis on projects which are important to the economic development of the state, such as research in coal, oil, gas, chemicals, and wood.
The Commonwealth of Kentucky is erecting a $1,000,000 research-center building on a 75-acre portion of this famous Bluegrass farm.

KENTUCKY builds Spindletop... a unique industrial RESEARCH facility

WITH THE dedication of its new Spindletop Research Center and Park, Kentucky has taken an important step forward in the progress of the State and the Nation—has created a unique institution through which the State, the University of Kentucky, and *private industry* can function as a three-way partnership in conducting any kind of industrial research which will contribute to the welfare of the partners and the people of Kentucky.

An architectural competition for the design of a $1,000,000 research center building has been held, a winning design has been chosen, and ground will soon be broken for the building itself. An additional 350 acres have been set aside for sale to private industries or associations interested in performing specialized industrial research.

Negotiations with several of America's largest companies on various kinds of research projects are now going forward.

If your company is considering any new research activities—if you might be interested in participating in the benefits of a research-park project, your inquiries are invited. The potential advantages for your company and its research people include actual financial economies—proximity to all the facilities of a great university—the inspirational and other benefits of intimate contact with a concentrated group of research specialists in a campus-like environment—pleasant living and working conditions in a hospitable, middle-South community—active co-operation by hundreds of dedicated governmental specialists in nearby Frankfort, the State Capitol city.

For complete facts, please address:
Lieutenant Governor Wilson W. Wyatt, or
E. B. Kennedy, *Commissioner,*
Department of Economic Development
800 Capitol Building, Frankfort, Kentucky

COMMONWEALTH OF
KENTUCKY
WHERE BIG THINGS ARE HAPPENING

Tax Credit

More Calories Needed

Earlier this year, we were encouraged by President Kennedy's forthright recognition of growing obsolescence in our industrial plant. We believed the administration's promises to create a better climate for capital investment and industrial modernization and growth.

We hoped that at long last we were on the road toward real reform of an archaic depreciation policy. And as a magazine that has campaigned vigorously for such reform for more than a decade, we awaited the unfolding of the administration's program with intense interest and anticipation.

We expected a wholesome dinner.

Now we feel that we have been offered a cup of watery soup.

The tax credit plan proposed by the Treasury has many weaknesses and deficiencies.

It is unduly complex. It is difficult to understand, and if enacted, it would become an administrative monstrosity.

It is uncertain in its tenure and would make long range planning for re-equipment difficult.

It favors expansion over modernization. We believe U. S. industry has a greater need for production efficiency than it has for new capacity.

It is more a subsidy than a reform.

It is discriminatory and preferential.

It is inadequate.

While we would like to applaud the administration for its recognition of the problem and for its move to do something about it, we can only express disappointment.

Time is running out. Thorough depreciation reform (one that will put us on a par with foreign competitors, both hostile and friendly) is needed now. As a preliminary to complete depreciation reform, we think the administration should do a lot better than the proposed tax credit.

We suggest a reasonable initial allowance that would approximate the first year obsolescence actually sustained. That could lead into real reform and could provide a better stimulus now.

It would at least put calories in the soup.

Walter J. Campbell

EDITOR

VIEWS OF EDITOR THE EDITOR VIEW

Heart surgery is always a matter of life and death.

The people who perform these operations and the equipment they use must work flawlessly. When they open the heart, it stops supplying blood to the body. So, they use an artificial heart and lung machine that pumps out the blood, keeps it at body temperature, removes carbon dioxide, adds oxygen and then returns it to the patient. This machine must not fail!

The design, construction and materials of the artificial heart and lung machine are the very best man can devise. Pemco, Inc. uses USS National Seamless Steel Tubing (Type 304 Stainless) for pump fittings, blood handling connectors and vessels.

For tubing that can meet the most critical requirements, ask for USS National Seamless Steel Tubing. National Tube Division, U. S. Steel, 525 William Penn Place, Pittsburgh 30, Pa.

USS and National are registered trademarks

This mark tells you a product is made of modern, dependable Steel.

National Tube Division of United States Steel

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United States Steel Supply Division
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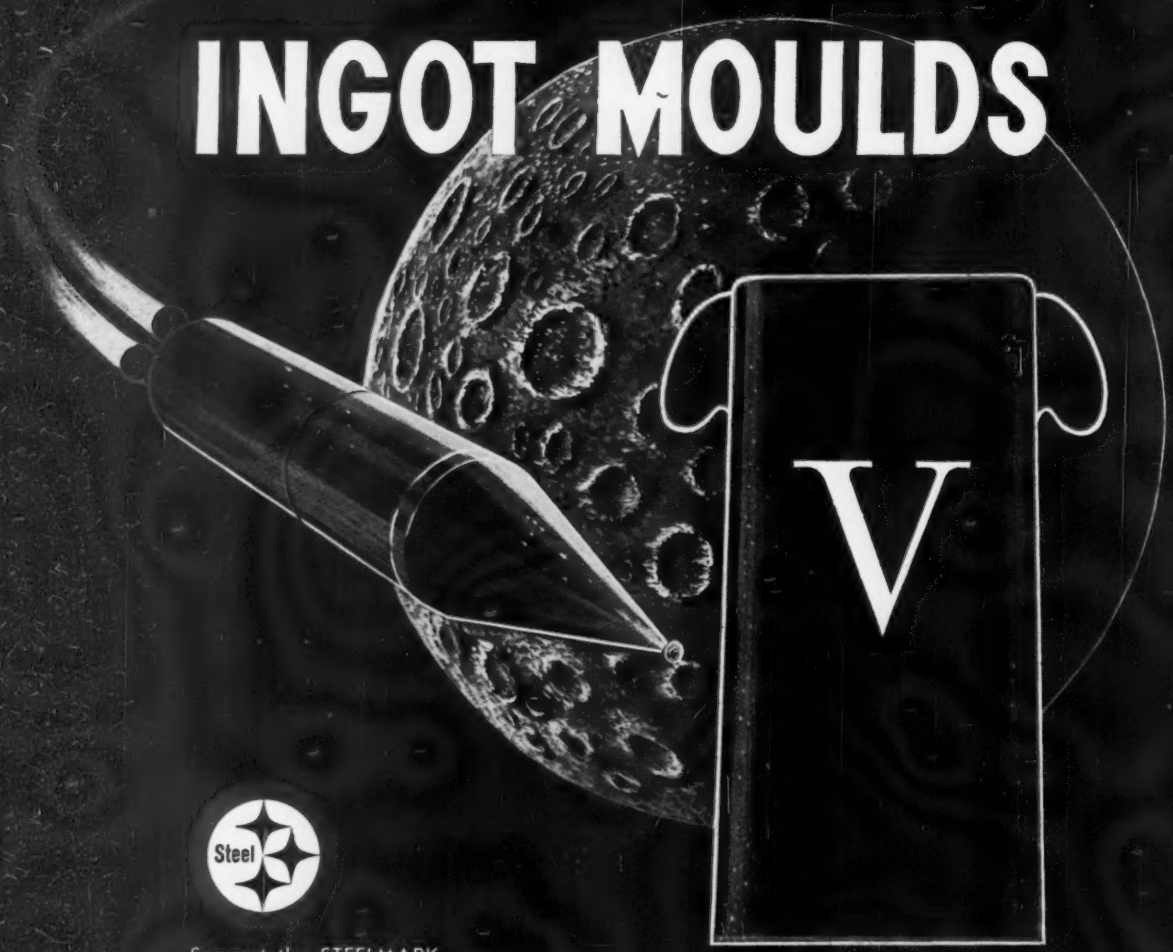
For over 75 years steel has been poured into Valley Moulds, and now the new metals... used in space .... will also be poured into

VALLEY INGOT MOULDS



Steel

Support the STEELMARK

VALLEY MOULD AND IRON CORPORATION

GENERAL OFFICES: Hubbard, Ohio
WESTERN OFFICE: Chicago, Illinois
NORTHERN OFFICE: Cleveland, Ohio

Industry speaks up on JFK's tax plan . . .

'Here's What We Want'

"ACT ON incentives now."
"DEFER action until depreciation reforms are completed."

The majority of industry spokesmen testifying before the House Ways & Means Committee want modifications in President Kennedy's tax incentive program that fall between those two extremes.

The one universal appeal: Don't let the tax incentive proposals kill further action on basic reform of antiquated depreciation laws.

• Capital Spending Deferred? — Most of the testifiers favored the President's objectives, but few agreed with the ways in which incentives would be determined. "It is an ideal time to inaugurate an investment incentive," said George Terborgh, research director, Machinery & Allied Products Institute, "and we suggest it be taken up and dealt with separately, without waiting for review of other recommendations in the Apr. 20 tax message. Treatment of the incentive as part of the package would delay consideration. There are reports that many companies are deferring commitments for capital goods until they know the final form and character of the proposed investment incentive."

Mr. Terborgh assailed the complex three bracket and floor arrangement proposed by the White House and urged committee members to consider "one of the simplest quick acting devices—initial writeoff on new investment." If the initial writeoff approach is adopted, he recommends across the board application at a rate of 30 per cent of invest-

SPOKESMEN FOR INDUSTRY appeared before the House Ways & Means Committee last week to offer suggestions about President Kennedy's tax incentive proposals (STEEL, May 1, p. 23). Here are highlights:

What They Said about Incentives:

- "Give a 10 per cent tax credit across the board."
- "Permit tax credit on all capital expenditures."
- "Remove the 30 per cent credit on tax liability."
- "Lower the six year limitation to include equipment with shorter lives."
- "Establish six years as the maximum life for eligible assets."
- "Allow capital gains treatment on sales of depreciated assets."
- "Offer credit on used as well as new assets."
- "Stimulate investment for modernization rather than expansion of capacity."
- "Consider benefits for small businesses which are underspending depreciation accruals and have difficulty attracting investment capital."

What They Said about Depreciation Reform:

- "Realistic depreciation reforms are needed now."
- "Institute shorter depreciation schedules."
- "Allow 30 per cent depreciation on new machines each year."
- "Eliminate the $10,000 ceiling on the 20 per cent initial writeoff allowance."
- "Adopt the Smathers-Keough Bills."
- "Enact the Herlong-Baker Bill."
- "Don't halt study and action on depreciation reform because of the tax incentive proposals."

ment without limitation. "If the tax credit approach is followed," he said, "we recommend substitution of a 10 per cent credit across the board for the bracket system."

• **Problem vs. Solution**—"Because they are aimed at solving the problem, and not merely directed to a theoretical result, I endorse the Smathers-Keogh Bills," testified W. D. Dickey, treasurer, Universal-Cyclops Steel Corp., Bridgeville, Pa. (Mr. Dickey also spoke in behalf of Carpenter Steel Co., Reading, Pa.) "The bills are aimed at asset lives . . . and action on them would involve less risk, confusion, and misdirection than the proposed tax credit plan," he said.

Mr. Dickey emphasized that desired benefits under the tax credit plan would not be forthcoming much before mid-1962. If final passage of the tax bill occurs in July or August, industry will have to familiarize itself with the changes and reevaluate capital budgets and projects. He said: "If the tax credit is the only acceptable course . . . I recommend it should be designed to apply to all capital expenditures subsequent to a given date, rather than those in excess of depreciation. If that's not acceptable, I favor deferment of any investment incentive program pending completion of the Treasury's studies of depreciation reform."

• **Not Asking for Gifts**—"A company which had made heavy capital expenditures last year or the year before would not be given any relief by this (tax credit) plan," said Joseph H. Workman, president, Latrobe Steel Co., Latrobe, Pa. "Depreciation reform is the necessary move. Tax credits are a form of subsidy which we do not want. It would seem that we are being offered a gift package with the hope that we will not then be in a position to ask for proper long term corrective action. We do not want subsidization. We do not want gifts in the form of tax credits. We want to use our depreciation dollars as they are used by our competitors in Europe—to expand our economy, to absorb excess manpower, and to enable us to compete throughout the world."

E. H. Bengston, assistant treasurer, Scovill Mfg. Co., Waterbury, Conn., who spoke on behalf of the copper and brass mill industry, agreed with Mr. Workman. "A realistic depreciation policy would provide the most immediate, best, and simplest method of investment incentive," he testified. If investment incentives win out, he suggests modifications including: "Make the credit 7 per cent on all new expenditures for depreciable property; allow credit on expenditures when they are made; allow credit in full and not limit it to 30 per cent of taxable income."

• **Slugs Small Business**—Appearing on behalf of the Association of Steel Distributors Inc., and the National Federation of Independent Scrap Yard Dealers Inc., Morris Rosoff, New York attorney, said: "If used equipment were excluded from the intended tax relief, then, to a large extent, small business would be excluded from such assistance . . . Small businesses are . . . likely to purchase used rather than new equipment." Mr. Rosoff also cited the fact that most purchasers of new equipment finance part of the new acquisition through the sale of used equipment.

• **Vehicle Problems** — Speaking against the six year limitation on the investment incentive credit and the elimination of capital gains treatment on sales of depreciated assets was Arnold J. Schoen, chairman, American Automotive Leasing Association and executive vice president of Four Wheels Inc., Chicago. (He also testified on behalf of the Car & Truck Renting & Leasing Association.) "Automobiles must be turned over every two years," he said, and added that elimination of the capital gains provision would deny members' protection against erosion of capital resulting from the sharp upward trend in new auto prices.

The Herlong-Baker Bill received support from Leslie K. Pollard, assistant to the president, Ray-O-Vac Co., Madison, Wis., who also spoke for the Wisconsin Manufacturers Association. The bill's "great emphasis is on reform of steeply graduated personal tax rate structure," he commented, and "it would also reduce the corporate rates, institute fundamental reform of depreciation, reduce rates on estates and gifts, and stop the confiscation of capital when funds are transferred from one long term investment to another. All of these would do more to release capital for productive, balanced use, than more drastic legislation confined to one or two areas. Individual and corporate rate reductions, and depreciation reform (in the bill) would be achieved gradually over a five year period."

• **Immediate Relief** — Joel Hunter, president, Crucible Steel Co. of America, Pittsburgh, favored the approach in the Smathers-Keogh Bills and discussed reinvestment depreciation. In the tax credit proposal, he suggested inclusion of a lower flat rate of credit for all expenditures for depreciable property in the year of such expenditures. He concluded: "Immediate practical relief is necessary. If this is impossible through depreciation reform and is possible through tax credit, then the tax credit should be enacted into law. However, it is complicated and uncertain and should be revised."

Joel Barlow, a member of the Taxation Committee of U. S. Chamber of Commerce, urged the committee to reject the investment tax credit proposal and postpone withdrawal of capital gains treatment on disposition of depreciable assets until there can be basic revision of tax depreciation allowances. He also urged elimination of the $10,000 ceiling on the 20 per cent initial writeoff allowance, saying: "We believe this action should be taken to counteract the deterrents in tax depreciation policies."

• **What's Ahead?**—The tax credit proposal faces tough opposition. One of the Ways & Means committeemen, Rep. John W. Byrnes (R., Wis.), spoke forcefully against the plan's shortcomings: "It is poorly received by most of the industrial community . . . and the adoption of the tax credit gimmick could well operate to defeat basic reform of our outmoded depreciation practices . . ."

Washington observers comment that congressmen, Representative Byrnes among them, are really seeking answers on ways to get a better law—checking proposals on how to amend, modify, and improve the incentive plan so it will be palatable to all groups. The proposal is given a 50-50 chance of passage.

Copper Mills Aim at Auto Markets

THE COPPER MILL (nee brass mill) industry is developing a major program to woo automakers. The aims: To keep present uses, to encourage new ones, and to win back some that have lost out to competing materials.

Members of the Copper & Brass Research Association, meeting in Hot Springs, Va., last week, voted to establish a Detroit office as a first step to expand automotive usage of copper and its alloys.

• **Eleventh Hour**—The automotive industry is the largest single market for copper mill products (200 million lb in 1960), yet usage has been declining as certain traditional copper items become smaller (such as radiators), as design changes eliminate other uses (like external radiator caps), and as competing materials gain at copper's expense.

While the hour is late, the mills believe time remains to improve their image and follow the lead of aluminum, plastics, zinc, and stainless steel in encouraging more automotive use through stepped up and more pinpointed research and development, more publicity, greater co-ordination, and more direct contact with automakers.

"We have emerged from the 1960 recession with a renewed interest in our markets and a resolve to intensify product research and development to enlarge those markets," says G. P. Bakken, president of CABRA and of Chase Brass & Copper Co. Inc.

• **Now "Copper Mill"**—As part of its new look, the industry is trying to drop the term brass mill; it prefers copper mill as more indicative of the product it turns out.

One of the industry's problems has been the mishmash of terms that describe the various grades and alloys. For example, "architectural bronze" is really brass. "Nickel-silver" contains no silver. Even worse from the industry's standpoint are the alloys referred to as "aluminum bronzes." They contain only 10 to 20 per cent aluminum; the rest is copper.

Those terms will soon disappear. A code to standardize alloy designation via a numerical code system should be in effect by yearend.

• **Business Improving**—There's no doubt that the business front looks brighter. Sales have risen faster than expected. The industry now looks for a 4.5 per cent increase in sales volume in '61. So shipments could run like this:

	1961	1960
	(Millions of pounds)	
Sheets	593	577
Wire	80	78
Rods	404	391
Pipe & Tubing for Plumbing	309	277
All Other Tubing	282	272
Totals	1,668	1,595

If the sales trend rises through this year and the first half of 1962, as predicted, it could signal a sturdy advance for the entire metalworking industry. The brass mills have been one of the traditional bellwethers of industrial activity.

G. P. BAKKEN, CABRA president

Prices are still weak, partly due to the high level of imports. But indications are that imports will fall substantially this year. That may ease the strain on book prices and allow some firming.

Service Center Orders Rise

A SLOW BUT STEADY gain in steel service center business has been underway for two months, Robert G. Welch, executive vice president, Steel Service Center Institute, reported at the organization's convention in Washington last week.

Order volume was 12 per cent higher in the first quarter than it was in the last quarter of 1960. From March to April, business improved 3 to 5 per cent, Mr. Welch said.

• **More Buying** — Service centers have stepped up their ordering from mills. As of May 1, their inventories stood at 2.9 million net tons—50,000 tons higher than they were on Apr. 1. Stocks reached a high point (3.8 million tons) last summer. The low (2.8 million tons) was reached in March this year.

With basic steel operations rising, service centers expect to feel the full effect of increased demand in the last quarter. It should mean that their order volume this year will be 5 to 10 per cent over that of 1960.

Steel mill representatives interviewed by STEEL said they expect the uptrend to continue. They also predicted that the usual summer business dip will be less severe this year because of improved operations by metalworkers and the generally low level of steel inventories.

More managers are finding they can save dollars, meet competition, make faster decisions than ever before

When you can't afford or don't need full time equipment . . .

EDP Centers Fill the Gap

GROWING NUMBERS of metalworkers are turning to independent electronic data processing centers to gain the benefits of EDP without extensive equipment investment.

Services from such centers are helping them:

1. To speed analysis of marketing information.
2. To schedule production more effectively.
3. To keep inventories in proper alignment with sales and production.
4. To process payrolls, help establish product prices, and provide a host of other services.

Small and medium sized firms that can't afford or don't have need for the full time EDP equipment are not alone in gaining benefits from the independent centers. Large firms with limited data processing facilities are also using the centers to supplement their equipment and handle peak period workloads.

• **No Job Too Small**—"With large companies using computers to help make executive decisions, small companies have to avail themselves of data processing to keep up with competition," emphasizes J. W. McDonald, vice president, Recording & Statistical Corp., New York. Most service centers are equipped to handle almost any job—large or small. An official of Service Bureau Corp. (IBM subsidiary) says his company has processed jobs costing $10 to $250,000—the latter a piping flexibility analysis.

• **Testing Ground** — EDP centers can provide a testing and training ground for firms with equipment on order. Aluminum Co. of America's Cleveland works recently programed a complete product pricing job at the local data center on equipment Alcoa has on order. Roger S. King, Alcoa's EDP manager (Cleveland), reports that a file sorting operation required in pricing sand castings, permanent mold castings, forgings, and ingots once took 43 hours. It takes 45 minutes on the new equipment.

• **EDP Helps Sales**—Sales analysis by EDP gives companies marketing information when they need it most—now. Case in point: Nationwide Tabulating Corp., Hempstead, N. Y., developed a sales analysis for Welbilt Corp., Maspeth, N. Y., manufacturers of gas and electric ranges and air conditioners.

"We now know which salesmen are selling which models in certain territories," says Emanuel Miller, Welbilt treasurer. "We have 40 warehouses throughout the country. We know how many particular models are sold out of each ware-

EDP Service Centers Are Aiding Metalworking in These Areas

(Prepared for STEEL by Robert H. Schroeder, industry applications specialist, RCA's Electronic Data Processing Div., Cherry Hill, N. J.)

If you have this information	You can perform this function	And get answers in these areas
INPUTS	**COMPUTER FUNCTION**	**OUTPUTS**
Sales history Sales indexes	Long range forecasting	Projected sales
Projected sales Bills of material Cost records Routing information	Planning and master scheduling	Labor procurement Materials procurement Financial support Facilities procurement
Customer orders Manpower availability Equipment availability Routing information Bills of material Inventory Receiving information Production data	Production control	Short range forecasting Manufacturing order entry Detailed scheduling Machine loading Inventory control Purchase order releases Purchasing follow-up Vender quality control costing
Production data Inspection data	Quality control	Process revision indicated Material changes indicated
Customer orders Shipping costs Inventory Cost factors	Distribution	Shipping papers Invoicing Costing Warehousing recommendations
Inventory data Production data Customer data	Management reporting	Operating reports Financial reports Market statistics

house. In the past, it took two or three girls all month to go through our sales invoices to determine this information. As our orders are written out, a tape is prepared at the same time. We have the data by the fifth of the month now."

To prepare information for Nationwide's large machines, Mr. Miller's company purchased a punch tape machine and a punch tape-calculator combination. This $10,500 investment paid for itself in three years in labor savings.

• **More than Machines**—Six years ago, one large service center chain was servicing the government almost exclusively. Since then, there has been a shift in emphasis. "Today, about 70 per cent of our business is commercial," reports William W. Eaton, vice president, C-E-I-R Inc. (Corporation for Economic & Industrial Research), Arlington, Va. Calling its bureaus "research centers," the company emphasizes personal services performed by its staff of mathematicians, statisticians, engineers, economists, and social science specialists.

"We manage our operation to combine the latest in high speed computing equipment with the latest analytical techniques, talents and skills, such as mathematical model building, simulation, linear programing, statistical analysis," says Mr. Eaton.

• **Cost Factors**—Service center costs are determined by these factors:

1. Whether it is a one shot job or repetitive.
2. Time required for bureau staff to help customer define his problem and to design a program for the equipment.
3. Number and types of EDP equipment used.
4. Units of work to be handled.
5. Time of day—equipment rental rates may drop as much as 30 per cent after 6 p.m.

Programing (fitting the problem into a formula the EDP system can digest) may cost $10 to $15 an hour and take anywhere from a few hours to several days to develop. If a company can utilize an established program provided by the service center, total cost is less.

Although service bureaus can work from original records, data already compiled on cards or tapes will substantially reduce service charges. Complete, carefully culled data for machine consumption permits the production of more versatile reports, too.

• **Rates Going Down** — "Service center rates have continuously gone down for the last two or three years, and service bureau business has doubled each year for the last three years," observes Eugene Perlman, manager-Northeastern region, RCA's EDP Div. He predicts business should double again in the next three or four years.

Remington Rand Univac Div., New York, Sperry Rand Corp., lists these prices for equipment (hourly rate): Key punch, $3-$5; Univac 60 and 120, $20-$30; solid state computer with card input, $100; solid state computer with tape input, $150; scientific computer 1103, $150; scientific computer 1105, $550;

Why Steel Distributor Turned to An EDP Center

"Our task was to find optimum coil widths to reduce scrap."

JAMES J. DOLAN
Vice President
Dolan Steel Co. Inc.

To meet competition and speed management decisions on inventories and sales, Dolan Steel Co. Inc., Bridgeport, Conn., turned to an electronic data processing service center for help.

The generation of scrap was one of the major problems of this processor and distributor of flat rolled strip and sheets. Dolan's cutting operations were yielding 5 per cent scrap, which amounted to $500,000 based on annual sales. Company clerks made some progress when they began checking as many as 1500 orders each month to determine the most efficient widths to use and to anticipate which sizes should be stocked. But the clerical effort proved costly, and reports couldn't keep up with changing order patterns. Management knew it "needed a series of fast mathematical extensions on a regular basis."

A nearby Remington Rand Univac service center solved the problem.

James J. Dolan, vice president, describes the benefits his company received (for $170 per quarter) during the first year:

1. **"A direct saving in scrap of $100,000. We expect this figure to increase as we learn to interpret our reports better.**
2. **"We have increased our number of 'straight cuts' by 55 per cent. It is no longer necessary to mix orders in an effort to cut down on scrap.**
3. **"We can anticipate orders for a coming period, including those gages and finishes most commonly ordered in our inventory.**
4. **"For slight additional cost, we get additional reports, including weekly analyses of steel orders by gage, temper, finish, and delivery required. Included too are monthly sales analyses of orders broken down by customer, salesman, and year-to-date by customer."**

Univac 1, $350; and Univac 2, $550. For personnel (per hour): Junior programer, $10; senior programer, $15; and coding service, $10-$15.

• **A Growth Industry**—"Electronic data processing is one of the nation's fastest growing industries," says Donald H. Kunsman, vice president-general manager, RCA's Electronic Data Processing Div., which operates centers in New York, Chicago, Washington, and Cherry Hill, N. J.

Estimates indicate over 300 computer service centers in the nation of which more than 200 are independently owned and operated. Most manufacturers of EDP equipment operate centers.

IBM's five "do-it-yourself" Datacenters, housing million dollar IBM 7070 data processing systems, permit customers to use their own programers and operators.

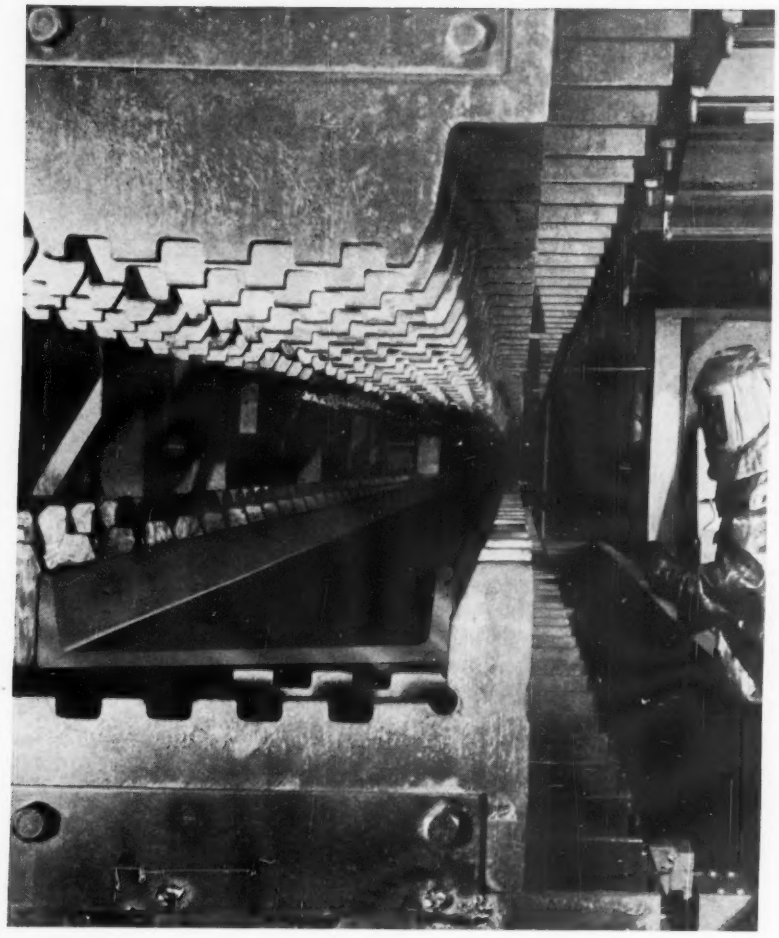
Service Bureau Corp., on the other hand, provides customers with a total package. It studies an application problem, programs it, then runs it on a data processing system and delivers results to the customer. SBC says it served 10,000 customers in 1960, including the country's 50 largest firms. Formed just four years ago, SBC now operates over 80 centers.

General Electric Co.'s Computer Dept. plans four new centers this year. A company official told STEEL installations are to be located in Schenectady, N. Y., Chicago, Washington, and New York.

Reflecting the growth of service centers is the recent formation of the Association of Data Processing Service Organizations, a group composed of independents, chains, and manufacturers. Its goals: Improvement of methods and standards, expansion of services to more customers.

Ronald Slimak, manager, Remington Rand's Univac Service Centers, and president of ADPSO, says service bureaus are constantly developing new services for new industries. He sees this ahead: Service centers operating on a remote basis with information coming in on wires from diverse points.

• An extra copy of this article is available until supply is exhausted. Write Editorial Service, STEEL, Penton Bldg., Cleveland 13, Ohio.



Clamps prevent distortion in quench. It's key as . . .

Alloy Shape Output Speeded

ROLLED STRUCTURAL steel shapes made from quenched and tempered alloy steels are now available commercially from U. S. Steel Corp., Pittsburgh.

Heat treated to design strengths up to three times that of structural carbon steel, the new shapes are claimed to provide "important weight and cost savings in a host of structural applications ranging from submarines to skyscrapers."

Furnished in standard I-beams, channels, and angles, and in lengths up to 40 ft, the shapes are produced from several of U. S. Steel's best known quenched and tempered alloy compositions, including: USS "T-1" and "T-1" Type A constructional alloy steels; 9 per cent nickel steel for cryogenic applications, and HY-80 naval armor steel.

• **Savings, Convenience Cited**— Frank T. Bumbaugh, manager of alloy products sales, says the new shapes will eliminate the need for many customers to cut quenched and tempered alloy steel plates and weld their own structural sections.

"Ready rolled shapes of 'T-1' or 'T-1' Type A constructional alloy steel, for example," relates Mr. Bumbaugh, "will cost only slightly more than the quenched and tempered plate material. A preliminary survey indicates that by using such steels, customers can realize savings of about 30 per cent compared with the cost of fabricating similar shapes in their own shop." He also notes that where it has been impractical to weld certain smaller shapes, the new rolled sections will serve many design needs.

"Designers can now specify off-the-shelf shapes of 'T-1' steel which have a minimum yield strength of 100,000 psi," says Mr. Bumbaugh. "And these shapes have the same toughness and weldability of 'T-1' steel plates."

• **Applications** — Machinery and equipment, especially mobile types such as trucks, cranes, barges, bulldozers, will be a major market. Here, explain officials, "the prime object is to carry the biggest possible payload with the least amount of dead weight."

Use in stationary structures will also be important, comments Mr. Bumbaugh, because "the 100,000 psi minimum yield strength will mean significant weight savings, not only in the finished structures, but also in terms of the tonnage shipped and handled during fabrication and erection. Less weight also means foundations will require less material."

• **Uses In Cryogenics** — Shapes of 9 per cent nickel steel will be useful where temperatures as low as −320° F are encountered. In the fast growing field of cryogenics, the nickel steel shapes will have wide use as stiffeners, ribs, and framing members for cryogenic containers of all types.

One of the keys to this industry "first" was the development of special fixtures (see picture) that clamp the shapes firmly to prevent distortion during the quenching operation. The wafflelike pattern of the fixtures permits full flow of water uniformly around all areas of the shape.

The rolled structural shapes are presently being quenched and tempered for U. S. Steel at the McKees Rocks, Pa., plant of the Van Dorn Iron Works Co.

Textile Message Holds Key to President's Trade Policies

LOOK to the "textile message" for a clue to President Kennedy's foreign trade policies, say sources close to the New Frontier planners.

They cite that portion of the message that said: "An application by the textile industry for action under existing statutes, such as the escape clause or the national security provision of the Trade Agreements Act, will be carefully considered on its merits." Textile trade sources promptly filed with the Office of Civil & Defense Mobilization for relief from foreign competition under the national security provision. (The industry has been unable to get relief from the Tariff Commission.)

● **RESEARCH PROGRAM PLANNED**—In response to the President's message, the Commerce Department reported: "Basic research is an area in which government properly might assist textile industries because many mills are unable financially to maintain such research on a continuing basis." The approach Commerce recommends: If custom receipts on textile imports were set aside, $80 million would be the government's share of a long range research program.

Recommendations included: 1. Development of new uses for textile products. 2. Improved product quality, appearance, and serviceability. 3. Improved manufacturing processes. 4. Improved design for end uses. 5. Study of related problems like recovery of waste products from the manufacturing process. 6. Free interchange of information among industry members.

● **TIED TO DEPRECIATION**—An important part of the New Frontier is the administration's hope that a more modernized U. S. plant can better compete with Japan and Western Europe. Treasury Secretary Douglas Dillon has added a revised Bulletin F (Internal Revenue Service agents use it to calculate machinery lives) to the incentive package now being analyzed by the House Ways & Means Committee.

● **TRADE ADJUSTMENT PRINCIPLE**—Early this year, a study by Sen. Warren Magnuson's (D., Wash.) Interstate & Foreign Commerce Committee recommended a procedure for aiding domestic industries hurt by foreign competition: First, all resources of government should be brought to bear on the problem (such as loans, research grants, relocation, and worker retraining); then, quotas or other restrictive trade policies should be considered. The report was much more liberal in trade policy than anything the administration has since recommended.

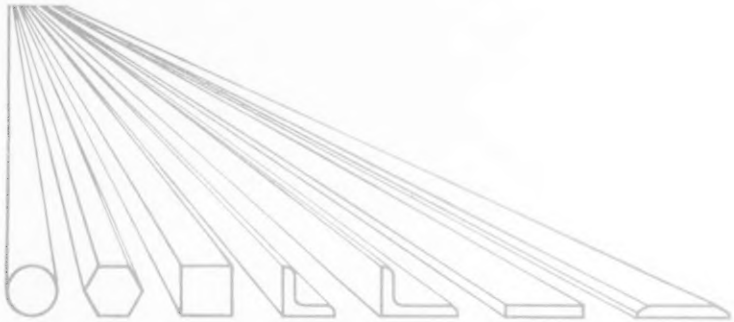
The President advocates international conferences designed to get foreign competitors to voluntarily institute quotas on their exports to us. He promises to send Congress more recommendations "to permit industries seriously injured or threatened with serious injury as a result of increased imports to be eligible for assistance from the federal government." That idea is the trade adjustment principle the Magnuson Report dwelled on. Some elements of trade adjustment are present in the recently passed area redevelopment legislation, but a more definite program appears on the horizon: For example, linking retraining benefits to unemployment compensation.

● **STATE, TREASURY CONFLICT**—The careful observer can see through the smoke screen of recommendations to the basic conflict between the State and Treasury Departments. Internationalists in government are already upset by the Treasury's new approach to taxation of income earned by foreign subsidiaries of U. S. corporations. But Secretary Dillon seems to have the upper hand for the moment. He hints that he will go so far as to refuse to recommend Senate consent to certain tax sparing treaties now in the works (India and Ghana are examples).

State Department aides are attempting to get a firm, long range foreign aid program to Congress, and the President has promised it. But Washington is full of rumors that the President will ask only for foreign aid funds for the current year and let his long range approach wait until next year. The President appears to be listening closely to Senate conservatives in particular, and observers of White House policy planning sessions suggest there is no one on hand to fight the State Department's free trade battle.

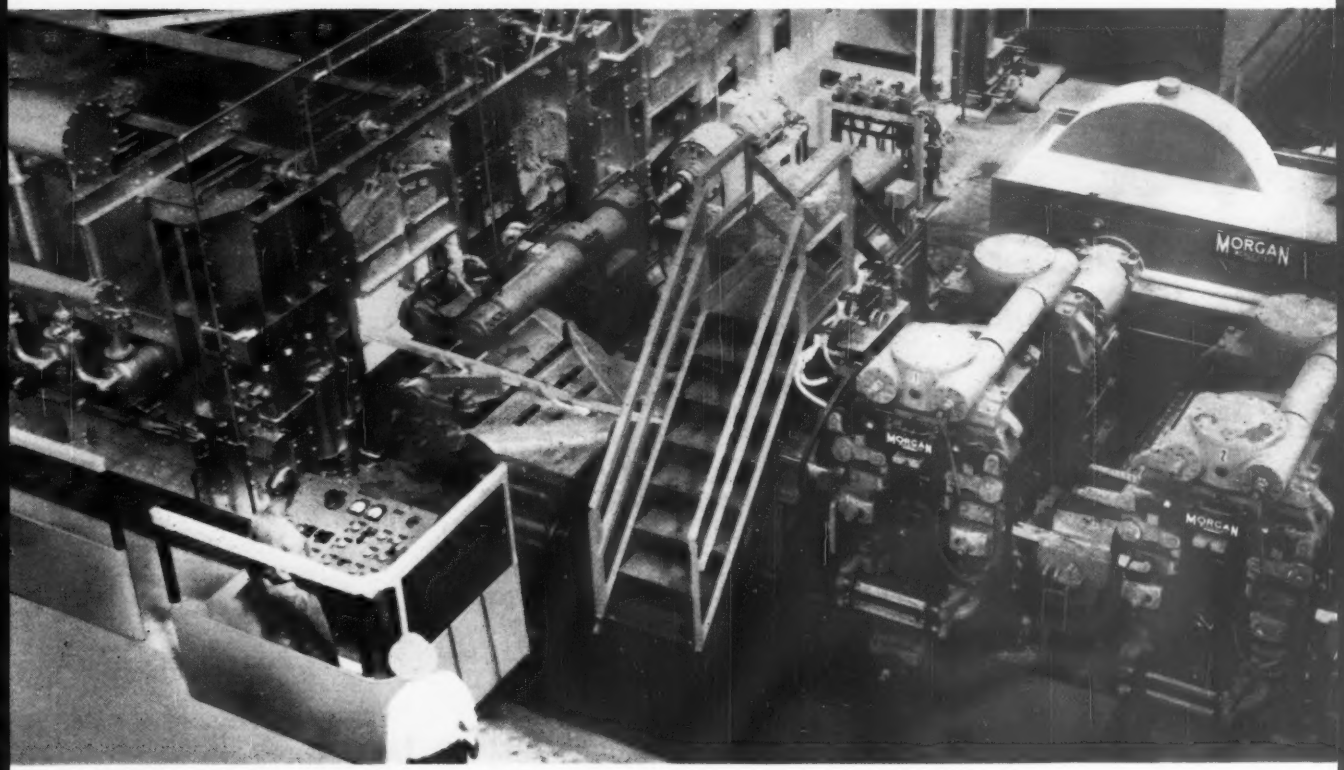
THE VERSATILE MILL WITH MARKETS IN MIND

Morgan Designed Mill for Sheffield has ability to Roll Wide Product Variety



ROUNDS • HEX'S • SQUARES • EQUAL ANGLES • UNEQUAL ANGLES • FLATS • BEVEL SKELP

Now rolling at three times previous production rate, the Morgan-built No. 2 rod mill in the Kansas City plant of Armco Steel Corporation's Sheffield Division was designed to turn out with equal efficiency any shape in the broad range of product demanded by current market trends. This example of Morgan creative engineering has gained world-wide recognition as the fastest 10″, 3-strand rod mill—proving again the operating benefits inherent in Morgan know-how and capabilities, accumulated in over 70 years of rolling mill pioneering.



MORGAN WORCESTER

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WORCESTER, MASSACHUSETTS

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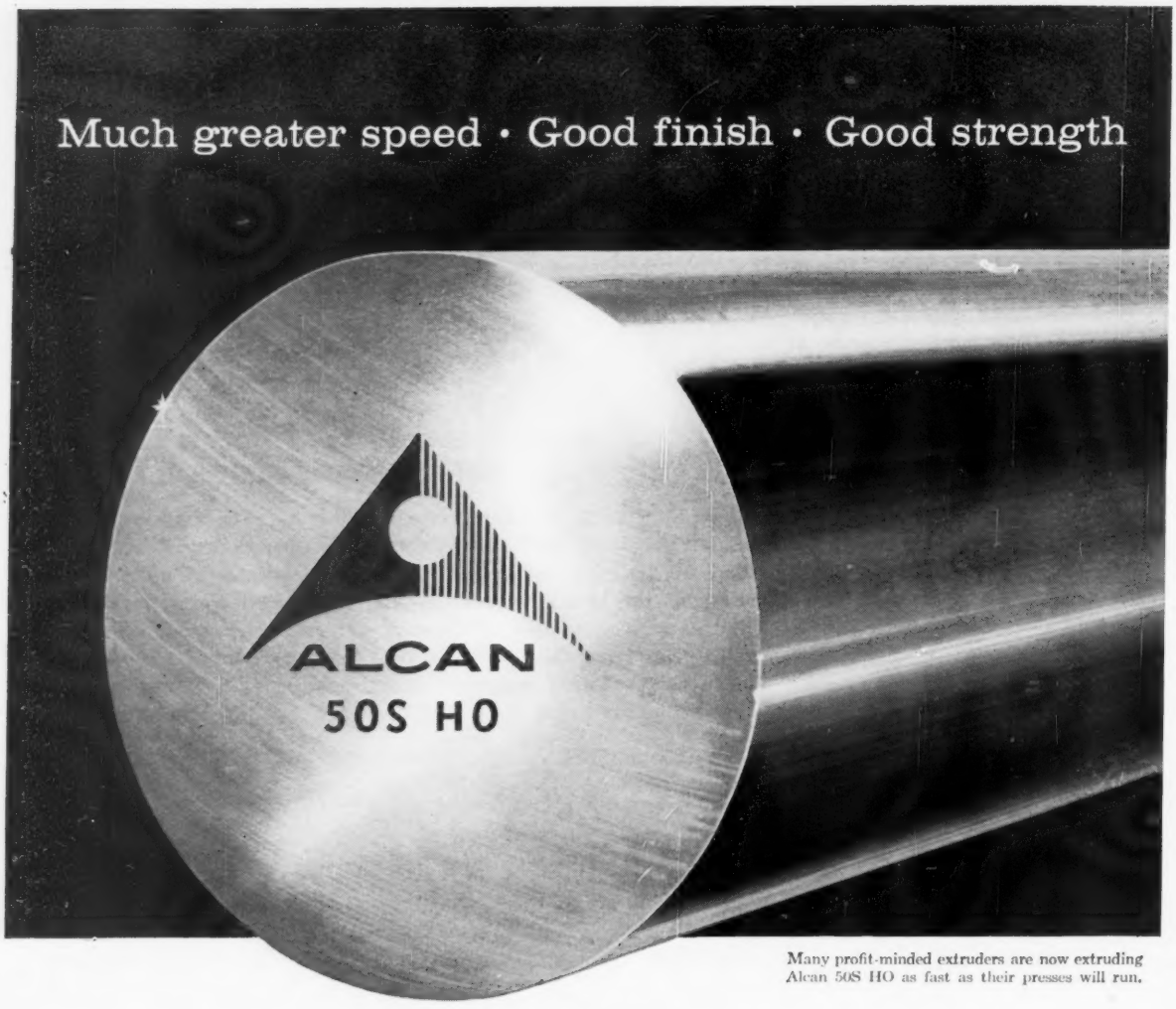
Much greater speed · Good finish · Good strength



Many profit-minded extruders are now extruding Alcan 50S HO as fast as their presses will run.

Here in one aluminum ingot...

much greater extrusion speed... plus good finish and strength

WHEN you run Alcan 50S HO you get greater production . . . per day and per machine-hour . . . while still maintaining good mechanical properties and finish.

That sums up the experience of many fabricators now using this much-improved version of the long-time favorite Alcan 50S. They're unanimously enthused about its increased press speed . . . *up to maximum press capacity.*

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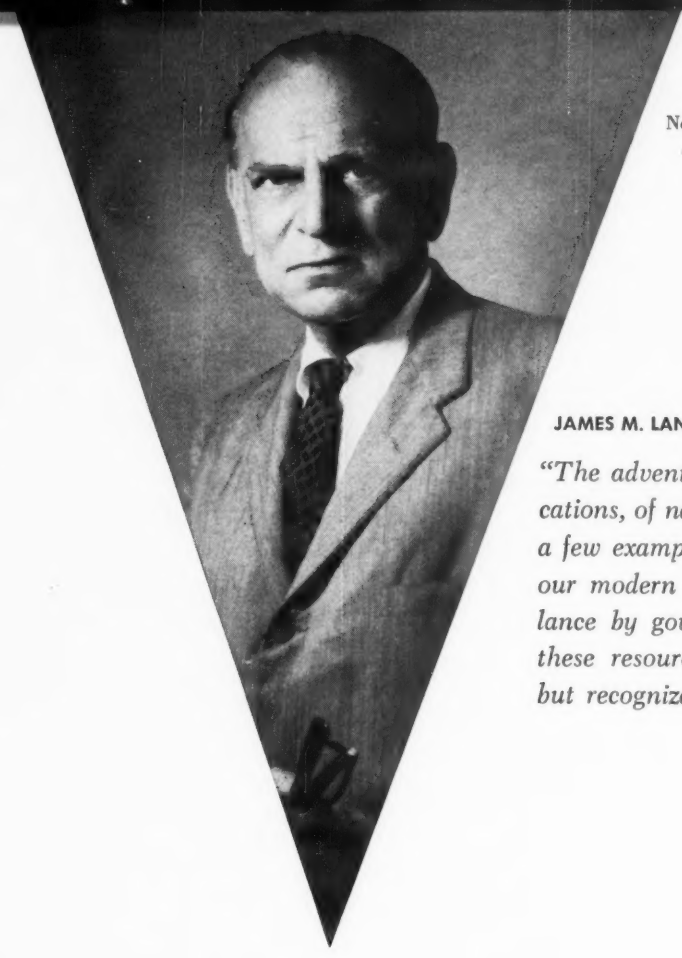


JAMES M. LANDIS, special assistant to the President

"The advent of atomic energy, of telecommunications, of natural gas, of jet aircraft, to cite only a few examples of the increasing complexities of our modern society, all call for greater surveillance by government of the appropriate use of these resources to further the admittedly dim but recognizable aims of our society."

The Pressure from Government

PROFIT GROWTH

HEED DEAN LANDIS' WARNING: Government regulation of industry is a fact of modern life. The Harvard dean made his forecast (above) in a special report to John F. Kennedy last December. While lamenting the almost impossible situation industry sometimes finds itself in when dealing with government agencies, Dean Landis never suggested it would be practical to have substantially less regulation—rather a simplification of procedures required to be observed by industry.

STEEL believes the problem goes much deeper than the regulatory agencies: The alphabet soup list on Page 84 includes many so-called independent groups (commissions, boards, bureaus, committees, administrations, offices, agencies, and what-have-you) of the federal government which do, to some extent, regulate industry.

Alphabet Soup

As special assistant to President Kennedy, James M. Landis has confined his attention to the seven big regulatory agencies: Interstate Commerce Commission (ICC), Civil Aeronautics Board (CAB), Securities & Exchange Commission (SEC), Federal Trade Commission (FTC), Federal Communications Commission (FCC), Federal Power Commission (FPC), and the National Labor Relations Board (NLRB).

Their regulatory functions are known, but who is to deny that the Small Business Administration (SBA) regulates the growth of small manufacturing firms as it administers the Small Business Investment Act? What is the Bureau of Labor Statistics (BLS) doing but regulating as it advises the secretary of labor on a law which requires all businessmen doing work for the federal government to pay certain wages? Isn't the Office of Civil & Defense Mobilization (OCDM) regulating when it hands down a decision on an industrial appeal for relief from foreign competition under Section 8 of the Trade Agreements Act? Isn't the Atomic Energy Commission (AEC) regulating when it establishes safety standards for reactors? Doesn't the Renegotiation Board regulate the aircraft manufacturer when it passes on the efficiency of the firm and determines what profits it deserves? And so on.

President Kennedy has defined

the problem: "The responsibilities with which the regulatory agencies have been entrusted permeate every sphere and almost every activity of our national life . . . These agencies and their performance have a profound effect upon the direction and pace of our economic growth."

Regulations on Growth, Profits

STEEL estimates the FPC has pending applications to build more than 5000 miles of pipeline. That is more than 1 million tons of steel not sold, if you look at it from the point of view of the pipe producer. (In 1960, 2.7 million tons of steel line pipe were shipped.)

William S. Story, executive vice president, Institute of Scrap Iron & Steel, reports his association has appealed to the ICC on rates the railroads set for scrap shipment "only as a last resort because of the cost of the appeal and the time to be consumed." Industry sources suggest the average case contested before the ICC runs from 18 to 36 months.

North American Aviation Inc. was asked by the Renegotiation Board to refund $20 million for profits made on government work in 1953 and 1954. A decision by the U. S. Tax Court on North American's appeal is confidently expected by the early part of 1962, a company source reveals.

Electronic Industries Association told a Congressional committee last month that a proposal to establish the "Federal Inventions Administration" (S. 1176) reaches into the fields of industrial knowhow and proprietary rights of firms. The association believes patent practices now enforced by some government agencies for work done under government contract amount to "confiscation."

Philip Sporn, president, American Electric Power Co., describes the difficulties of getting programs underway at the AEC: After close to $400,000 in private funds was spent on a research and development program, "it came as a complete surprise to us to learn that the commission had instructed the director of reactor development to look into the problem of immediate termination of the contract."

Those are but a few examples of the problems industry has with government regulations.

Not All Black

If you read between the lines of some of those examples, however, you see that industry's relations with government cannot all be likened to Snow White caught in the web of the wicked queen. In many cases, subsidies in one form or another to industry are involved. Conservatives consistently warn industry when it comes to Washington seeking relief from "unfair" competition, aid for research and development, or "protection" of any sort that regulation is a natural string tied to the dollar (in one form or another) package.

Electronics firms welcome government research contracts, even though profits are low. Mr. Sporn wants his firm in the nuclear energy business, rather than out of it, despite the regulatory handicaps.

Mr. Story of the Scrap Institute is glad he can seek relief from the ICC, having failed, he says, in four years of negotiations with the railroads to get them to recognize the "competitive similarity" of pig iron to scrap and to make their own application to the ICC for a rate adjustment.

Braxton B. Carr, president, American Waterways Operators, protests the railroads' desire to buy into the inland waterway industry: An ICC examiner has recommended that the Illinois Central and Southern Pacific Railroads not be allowed to enter the field. The railroads are

The Alphabet That

AEC	Atomic Energy Commission
BFC	Bureau of Foreign Commerce
BLS	Bureau of Labor Statistics
BPR	Bureau of Public Roads
BDSA	Business & Defense Services Administration
CAB	Civil Aeronautics Board
CRI	Committee for Reciprocity Information
Exim	Export-Import Bank of Washington
FAA	Federal Aviation Agency
FCC	Federal Communications Commission
FHA	Federal Housing Administration
FMB	Federal Maritime Board
FMCS	Federal Mediation & Conciliation Service
FPC	Federal Power Commission
FRB	Federal Reserve Board
FTC	Federal Trade Commission
GSA	General Services Administration
ICC	Interstate Commerce Commission
IRS	Internal Revenue Service
NASA	National Aeronautics & Space Administration
NLRB	National Labor Relations Board
OCDM	Office of Civil & Defense Mobilization
——	Renegotiation Board
SEC	Securities & Exchange Commission
SBA	Small Business Administration
——	Tariff Commission

Influences Metalworking

TYPICAL INTERESTS	EXAMPLES OF THEIR INFLUENCE
Patents, information, reactor site location	Little can be done in the field without AEC O. K.
Trade with the Communist Bloc	Licenses needed
Minimum wages (Walsh-Healey Act)	Most industries doing U. S. business
Federal highway program	Standards
Use of defense materials	Complete control in a period of emergency
Promotion of air commerce (routes)	Rates, competition, safety
Barriers to U. S. exporters overseas	Informs State Department of industry's needs
Guarantees for U. S. exporters	$7 billion in loans, guarantees, and insurance
Planning for advanced civil aircraft	Mach 3 transport program
Use of outer space for communications	Full control of satellite programs for commercial use
Urban development, promotion of housing	Mortgage rate influence
Construction differentials	Standards, shipyards
Labor-management disputes of national concern	Intervention
Natural gas pipelines	Rates, permission to build
Federal monetary policy	Influence on interest rates
Trade practices, mergers	Steel, aluminum, and many others
Stockpile sales	Market influence
Railroads, trucking, inland waterways	Rates, mergers, expansion
Corporate taxes, depreciation, expense accounts	Profits
Patents, information, research guidance	$1 billion a year budget
Union elections	All industry
Relief from import competition	Machine tools
Profits on government sales	Aircraft, missiles, ordnance
Financing	All publicly held corporations
Definition of a small business	Defense subcontracting
Establishment of tariffs on imports	Lead, zinc, and many others

EDITORS' NOTE: STEEL is confident it has forgotten at least one regulatory or independent agency, and apologizes beforehand. In the maze of Washington alphabetese, its editors also note the lack of identifying letters for the Renegotiation Board and the Tariff Commission, but it was felt those agencies should not be overlooked for that reason.

carrying their case to the full commission.

Regulations can mean life for new industries and the right for many companies to compete for the new business: The National Aeronautics & Space Administration's (NASA) award of Project Relay means the birth of the satellite communications industry. Without FCC control, a monopoly might emerge, says a Capitol Hill source watching the race among the large communications firms to win the NASA contract.

The Kennedy Reforms

President Kennedy has proposed reforms for several agencies (see Page 86) but they are generally regarded as not forceful enough. Other recommendations will be coming for other agencies; they will follow the same pattern. What the White House really wants is hinted at in the President's special message last month, but Congressional reluctance to release its own controls over the agencies has caused the President to adopt a soft sell approach.

In his message, he asked for coordination of regulatory action. For example: It is "wrong," he said, that one agency considers only its own industry or just a part of an industry. This compartmentalization becomes ridiculous when you realize, for example, that "the problem of mass metropolitan transportation is not merely that of the railroads, but of highways and buses, of housing, and even of helicopters."

STEEL was told at the ICC: "When we make a decision, we don't consider the effect on the airlines." That attitude can also be found at other agencies.

The President's other suggestions follow modern management practices: The commission's chairman should be given more authority. Individuals within the agency should be held responsible for the development of particular cases. Routine and internal matters should be settled below the commissioners' level. Appeals from decisions should be restricted to important cases.

The formation of the Administrative Conference of the U. S., headed by E. Barrett Prettyman, former chief judge of the U. S. Court of Appeals for the District of Columbia, and including about 65 agency

The Kennedy Reform Program

FEDERAL TRADE COMMISSION

Delegation of routine business to lesser officials of the agency, rather than having all decisions made at the commissioner level.
Make hearing examiners' decisions final.

SECURITIES & EXCHANGE COMMISSION

Delegation of some authority to officials below the commissioner level.

CIVIL AERONAUTICS BOARD

Increase the chairman's powers.
Broaden the board's authority to refuse to hear appeals on decisions made by examiners and other lower level officials.

FEDERAL COMMUNICATIONS COMMISSION

Delegation of routine business to officials below the commissioner level.
Increased authority to the chairman.
Allow panels of two or three commissioners (of the five) to hear cases.

FEDERAL POWER COMMISSION

Exempt small gas producers from rate regulations.
Exempt all pipeline companies from FPC procedures if they wish to construct extensions to (or replace) existing facilities (if they are not invading another company's territory).
Add two members to the commission; allow panels of two or three commissioners to make decisions.

representatives, lawyers, scholars, and businessmen, is a step forward. It will operate without encroaching on the prerogatives of the agencies, but will act as something of a watchdog.

White House sources promise, however, that more "microscopic" examinations of the agencies will be forthcoming. (The Federal Maritime Board is said to be on the list.) Attention is to be brought to the relation between agency decisions and the wages paid in the industry affected. A study of user charges in the transportation industry is also being made.

What Industry Can Do

If you believe in the reforms taking shape in Washington, you can take part in them and help direct them toward the interests of the nation and the free enterprise system.

1. Make your wishes known. Your congressman's vote could affect the future of your business. After communicating with your own representative, consider the leaders of Congress and the White House itself. Your trade association should be able to help you maintain contact with those people.

2. Be well informed. The complexities of the regulatory process are enough to make any industrialist stay clear of Washington. Resist the temptation. Business publications are the best source of current information.

3. Learn to live with the regulatory process in the sense that you don't shrug your shoulders and allow the "other fellow" to fight your battles. For example, one or two firms often can be found fighting a battle for a whole industry before the Tariff Commission.

4. Encourage good men to accept positions of responsibility in the agencies. One easy way to serve is through the many advisory groups set up to assist government departments. You take the big step when you make your availability for a political appointment known to your party.

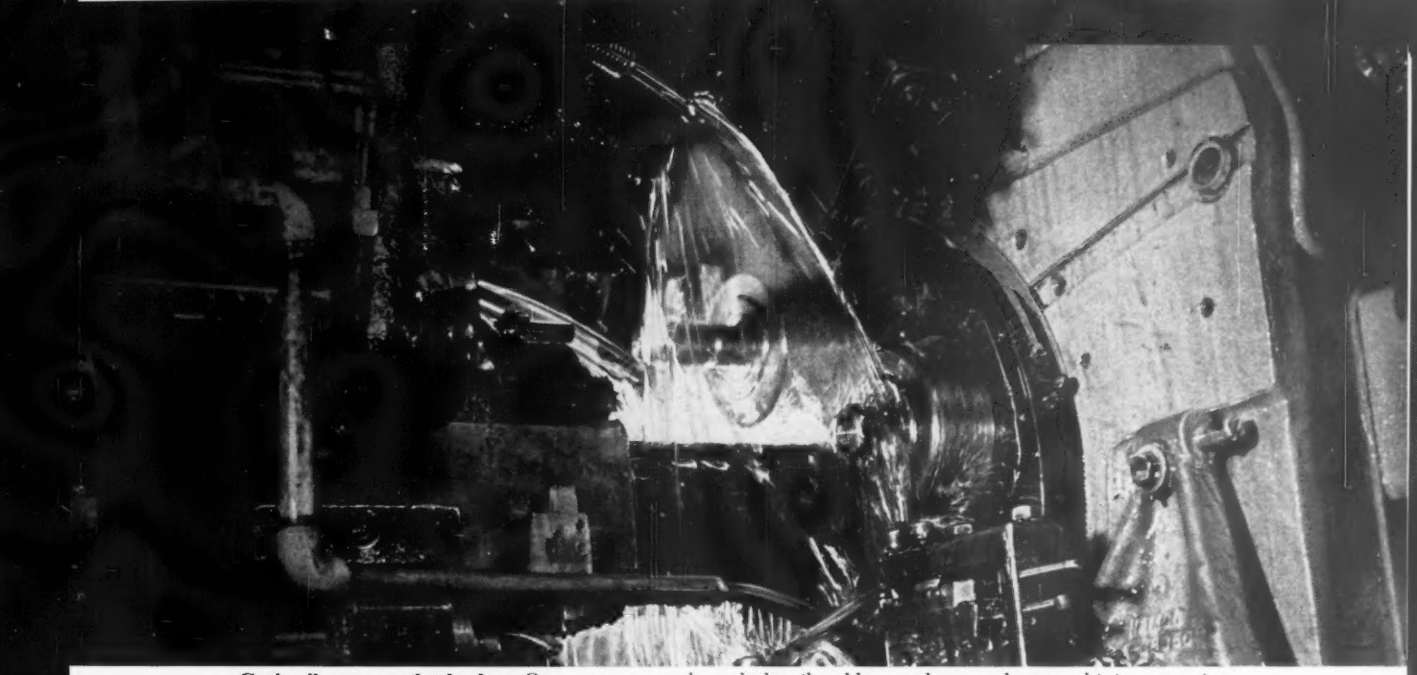
5. Set high standards for yourself and your firm. Dean Landis comments on the "personalized" approach to relations between industry and the agencies: "One of the worst phases of this situation is the existence of groups of lawyers . . . who implicitly hold out to clients that they have means of access to various regulatory agencies off the record that are more important than those that can be made on the record."

A trade association official told STEEL: "Industry can live with government regulations. But it's high time a constructive approach were taken to making the regulations better for the national interest, rather than seeking to subvert them for a personal or one industry reason."

Perhaps the most constructive approach of all is that of coal, copper, zinc, and other industries: Research to create a more competitive product. A new coal research laboratory being built near Pittsburgh is financed by electric utilities, equipment manufacturers, railroads, chemical companies, and engineering firms. That sort of co-operation can do more to relieve industry of its regulatory ills than several appeals to Washington bureaucracy, and the cost can be less.

Plan for Profit Growth
How to Campaign for It

On June 5, STEEL will show how more metalworking managers can get into politics to win realistic taxes, sensible zoning, and other co-operation from government. For a free copy of any or all articles in this series (appearing biweekly since Jan. 16) write: Editorial Service, STEEL, Penton Bldg., Cleveland 13, Ohio.



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Today, Shell's new Garia® Oils are helping machine shops improve metal finish and prolong tool life—even in heavy-duty cutting. And because Garia is transparent, operators can see the work at all times.

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Now Shell Garia Oils have the transparency of light mineral oils and the rugged qualities of heavy-duty oils.

With Shell's improved Garia Oils, operators can see through the oil film. Work can be inspected more easily.

Garia Oils prolong tool life in three key ways:

1. Garia Oils help prevent metal pick-up. Shell Garia Oils form a more effective film between the work and the tool. This provides better anti-weld protection, and helps prevent metal pick-up on tools.

2. Garia Oils help keep work cooler. Even with high-speed cutting, the metal stays cool.

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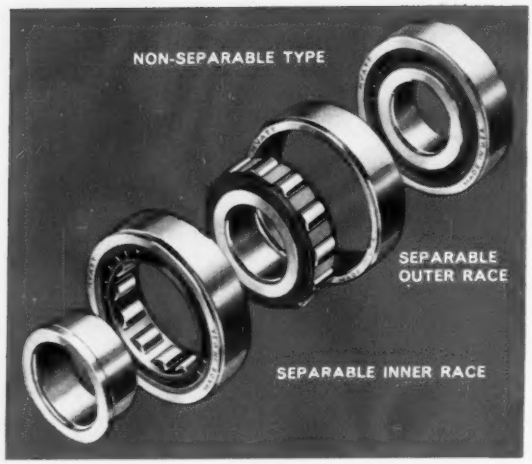

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No one knows more about cylindrical bearings than your Hyatt Sales Engineer and all the engineers behind him. Call your Hyatt Sales Engineer for any bearing problem you have—and let him save you man-hours and dollars.

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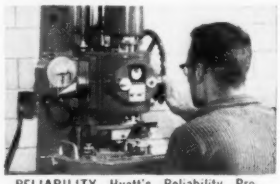

RELIABILITY. Hyatt's Reliability Program embraces every phase of product development and product performance.

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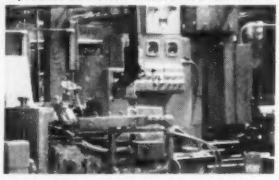

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Convertible Sales Climb Steadily

	Percentage Of Market	Factory Unit Sales
1960	5.0	304,538
1959	5.0	254,880
1958	3.4	193,717
1957	4.6	284,682
1956	3.4	198,962
1955	3.0	239,790
1954	2.8	155,667
1953	2.6	159,200

Source: Automobile Manufacturers Association.

GM Readies Compact Ragtops for Debut

UNLESS DETROIT tipsters are wrong, GM's Chevrolet Motor Div. has a compact convertible hiding under the H-35 designation which currently is being applied to the 114 in. wheelbase car the division is putting into its line just above Corvair. It looks like Buick-Oldsmobile-Pontiac small cars also will offer ragtops in '62, although they may appear later in the year. H-car production reportedly is scheduled to start in mid-September.

The market for convertibles has always been limited, but it's growing steadily and autodom's product planning people think it will expand faster as the bulge of war baby car buyers now entering the market place crowds more sedate car owners into smaller purchasing groups.

Automakers first shied away from the more expensive soft tops for compacts because they felt economy minded buyers wouldn't pay the price. But success of sporty small cars like the Corvair Monza has proved that isn't true. Even the less glamorous Rambler American and Studebaker Lark convertibles are selling well. American Motors Corp. reports 7200 American soft tops have been sold so far. That's about a quarter of current production and may figure out to nearly 10 per cent of the model run. Studebaker-Packard Corp. says 1600 Lark convertibles have been delivered this model year. That's 3 per cent of production.

There also has been some question as to whether the smaller unit bodies could be beefed up enough to carry all the structural load below the belt line as is necessary with convertibles. The slightly larger compacts make that feasible, in terms of engineering and costs.

If the reports are right, GM appears to have stolen a march on Ford Motor Co. and Chrysler Corp. They apparently are a model year away from similar cars. Valiant-Lancer is due for a new body shell in '63 and latest word is that Ford will follow suit on the Falcon even though original plans were to keep the present body for five years. Chrysler Corp.'s 1963 cars are suposed to be "way out" in that many of the missilelike styling features (off-center tail fins and cockpit canopies) seen on recent company dream cars are being adopted.

● **Transaxles Dead**—Chevrolet and Pontiac will continue to use the axle-transmission combination for smaller cars, but other automakers seem to have canceled plans to move the transmission to the rear. Reasons: Lighter engines no longer make it so important to lessen front end weight by shifting the transmission aft. Development of inexpensive, double yoke, universal joints has made it possible to virtually eliminate driveshaft tunnels. Tilting the transmission has done away with most of the hump in the front floor area.

Use of alternators on regular pas-

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Impact of the Compacts . . .

It Takes Less Steel to Build an Auto

(Pounds per vehicle*)

	1960	1959	1955
CR Sheets	1609	1822	1720
HR Sheets	835	974	837
CR Strip	79	110	133
HR Strip	114	116	185
Bars	578	697	726
Tubing	41	54	47
Drawn Wire	54	64	72
Totals	3310	3837	3720

Source: AISI:
*Figures cover passenger cars and trucks. Not included: Scrap breakouts, amounts for replacement parts.

senger cars has been limited to Chrysler Corp. Now it looks like Ford will introduce a 25 ampere alternator on Lincolns during the 1962 model run. It's also scheduled for the Cardinal. GM isn't expected to adopt it until 1963.

A mechanically actuated, vacuum brake booster made by Midland-Ross Corp., Cleveland, has been slid into some Ford Mercury cars as a running change. Its use is expected on all but one Ford Motor Co. line next year. The unit is self-contained. It's mounted on the firewall directly behind the brake pedal. It's supposed to replace a remote controlled, Bendix booster.

• **Materials**—As STEEL has reported previously, use of galvanized materials for rocker panels and frame members is increasing. But in talking to American Zinc Institute members, John C. Widman, one of Ford Motor Co.'s advanced product design executive engineers, sounds a warning. He says recent inspection of welding problems has revealed broad variations among galvanized supplied by different mills. Says Mr. Widman: "It would appear that the major improvements for uniform welding must come from the industry in ferreting out the reasons for this wide variation and developing means to control it." He charges that galvanizers must improve quality or face the likelihood of losing out to more effective and possibly lower cost corrosion prevention techniques. He suggests that bonded joints which permit the use of vinyl coated steel may be one method.

Still another corrosion preventive which automakers are investigating is a synthetic latex developed by Goodyear Rubber Co.'s Chemical Div., Akron. J. E. Warner, Coating Dept. manager, says metals treated with the air dry primer show no traces of corrosion even after 100 hours of continuous exposure to salt spray. Costs are said to be competitive with galvanizing. The material is under serious test at two auto companies. A big advantage to auto plants—the solventfree latex virtually eliminates fire hazard which makes for lower insurance rates and more efficient layout of priming facilities.

While aluminum has been getting its knocks as a bumper material (only Pontiac will try 2500 special aluminum bumper sets next year), it's still finding new uses in functional castings. The latest are cast aluminum door hinges which will start appearing on some GM cars next year. The lighter metal will be used only when threaded holes are not required.

Reliability Is a Must

NOW THAT automakers have extended warranty periods to a year, the reliability of parts is critical. Carbuilders are using numerical ratings to help them select suppliers who can turn out rejectfree parts. It works like this:

Suppose a product contains only one part, and that 1 part out of 10 doesn't work. Result: 90 per cent reliability. But if the product has three parts, and 1 out of 10 components fails, reliability drops to 73 per cent. Only 7 of the 10 units would work. The more parts in each product, the more reliable each part must be.

In emphasizing the concept for members of the Society of Automotive Engineers, Lloyd M. Steward, reliability director of GM's AC Spark Plug Div., asserts: "Suppose you apply the famous 99.44 per cent pure figure as a reliability factor to each of the 728 critical parts in one of today's cars. How many of you would want to buy it? It carries only 1.7 per cent reliability."

What does this method of rating reliability mean to suppliers? Mr. Steward points out that one of the functions of his department is to provide vender ratings and investigate supply sources for purchasing. With 12 month warranties, GM and its competitors can't rely only on old style quality controls. Firms that can maintain a high reliability factor stand a better chance of having their bids accepted. The formula makes it simpler to determine the history of each supplier's performance.

Exhaust Notes . . .

• Shipments of U. S. built cars to foreign countries during the first quarter fell 15.7 per cent below the year ago pace, reports the Automobile Manufacturers Association. Some 38,973 cars were exported.

• Robert S. Giles, manager of American Motors Corp.'s plastic research and development, predicts that the material will eventually be used to make some automobile engine parts. AMC engineers previously forecast that use in the average car could increase to 100 lb by 1970. It's now about 22 lb.

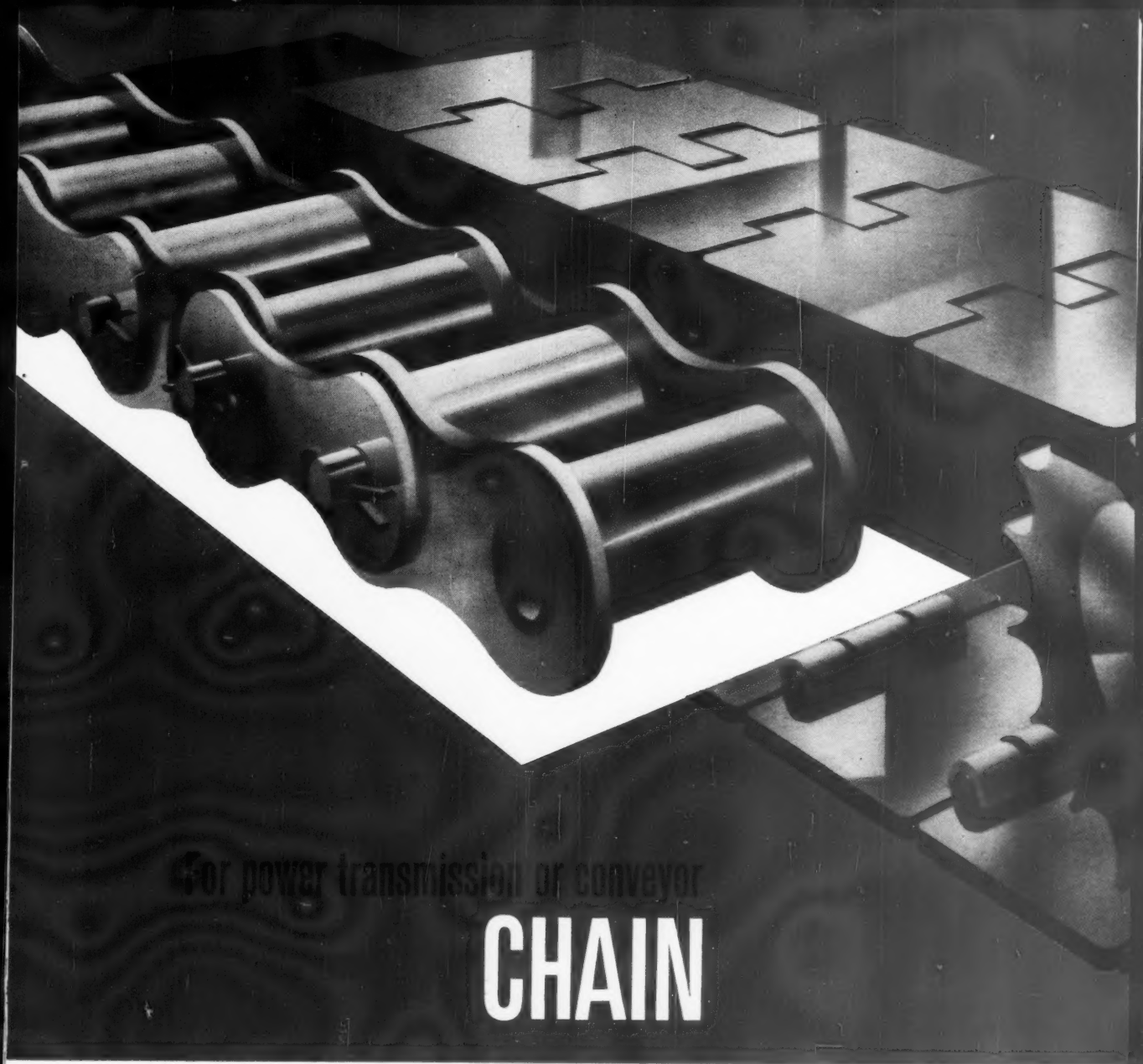
U. S. Auto Output

Passenger Only

	1961	1960
January	415,857	688,690
February	364,385	659,298
March	407,959	654,242
April	446,740	582,909
4 Mo. Totals	1,634,941	2,585,139
May	.....	611,226
June	.....	613,147
July	.....	434,377
August	.....	305,527
September	.....	407,685
October	.....	617,816
November	.....	597,132
December	.....	522,239
Total	.....	6,694,288

Week Ended	1961	1960
Apr. 15	114,108	135,412
Apr. 22	124,459	144,886
Apr. 29	114,378	135,515
May 6	124,454	142,091
May 13	129,928†	145,917
May 20	130,000*	154,755

Source: *Ward's Automotive Reports.*
†Preliminary. *Estimated by STEEL.



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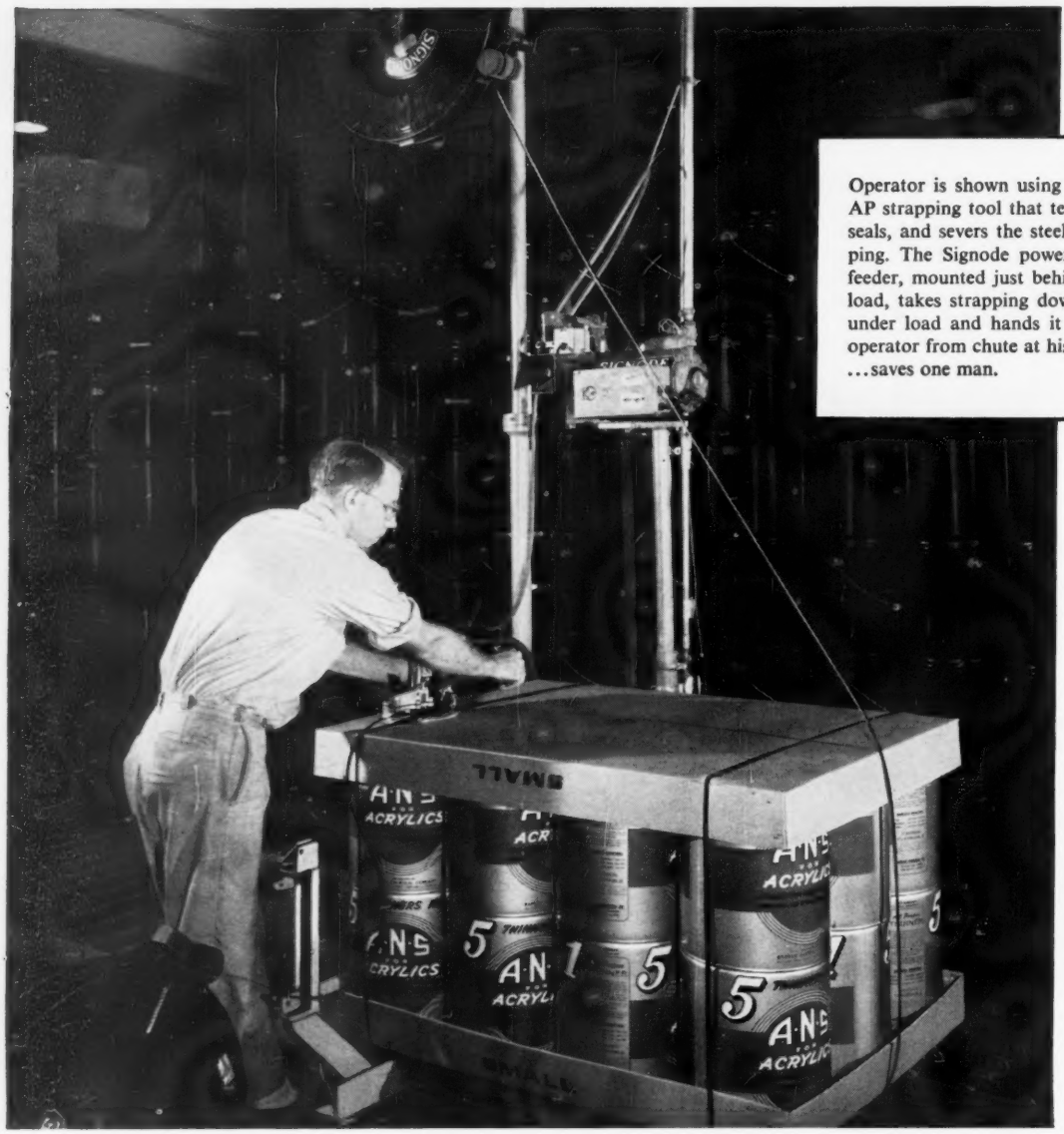

Operator is shown using Model AP strapping tool that tensions, seals, and severs the steel strapping. The Signode power strap feeder, mounted just behind the load, takes strapping down and under load and hands it to the operator from chute at his knees ...saves one man.

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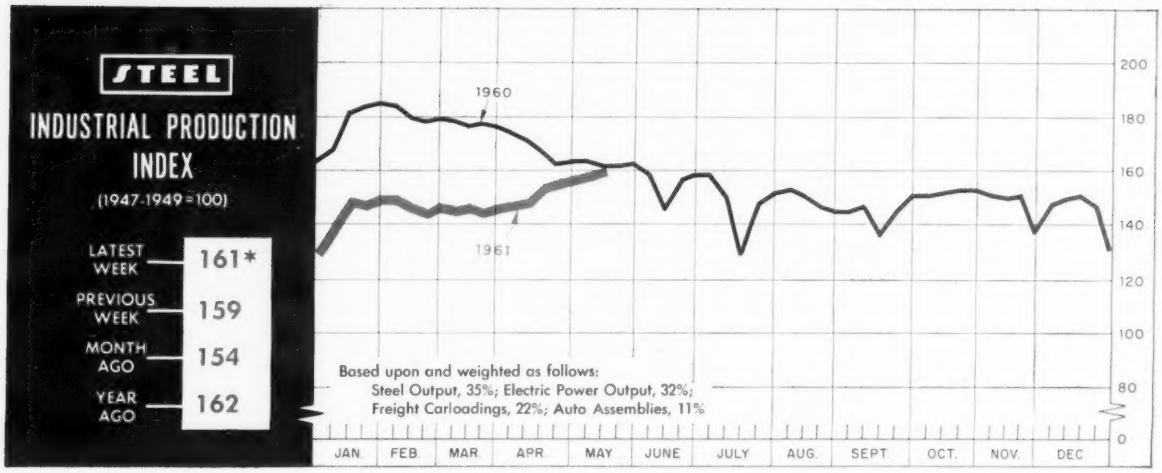

*Week ended May 13.

Autos Strong Factor in Upswing

NOW that the immediate health of the nation's economy has been officially pronounced to be on the mend, businessmen are trying to determine how fast and how far the recovery will go. And, as usual, many are looking at the automotive industry for a clue.

What they see over the short and intermediate future is encouraging. Production is fairly strong—about 130,000 cars a week. Sales are strengthening—April, which ran a little better than 3 per cent over the March rate, ended on a strong note. Inventories are in the best shape in months—912,500 units, or slightly under a 50 day supply.

• **More than Cars**—To many businessmen, the situation means more than a good quarter for car production. While motordom accounts for only 5.04 per cent of the Federal Reserve Board's industrial production index, it probably cuts across more segments of the economy than any other single industry. Sherwood H. Egbert, president, Studebaker-Packard Corp., estimates that one business in six derives its income directly or indirectly from the auto. And so does one wage earner out of every six, he adds.

Heavier assembly schedules have already been partially responsible for the improvement in total industrial production. The FRB index jumped 2.5 per cent in April (see graph and table, Page 94). Car output for the month was 446,740 units, about 39,000 units better than in March. That helped boost steel production (it constitutes another 6.21 per cent of the FRB index) 7 per cent above the March level.

• **Trends Continue**—The auto and steel industries will probably show even more improvement in May than they did in April. Detroit is scheduling at least 500,000 cars this month. Steel producers in the Detroit area tell STEEL that June deliveries are being shoved up into May, and that new orders are more

BAROMETERS OF BUSINESS

	LATEST PERIOD*	PRIOR WEEK	YEAR AGO
INDUSTRY			
Steel Ingot Production (1000 net tons)	2,025[1]	1,988	2,031
Electric Power Distributed (million kw-hr)	14,250[1]	14,206	13,350
Bituminous Coal Output (1000 tons)	7,320[1]	7,410	8,398
Crude Oil Production (daily avg—1000 bbl)	7,100[1]	7,139	6,794
Construction Volume (*ENR*—millions)	$559 7	$418.8	$385.8
Auto, Truck Output—U. S., Canada (*Ward's*)	162,848[1]	156,380	182,029
TRADE			
Freight Carloadings (1000 cars)	550[1]	544	640
Intercity Truck Tonnage (changes from year ago)	−0.8%	−2.7%	−2.0%
Business Failures (Dun & Bradstreet)	399	369	327
Currency in Circulation (millions)[2]	$31,968	$31,843	$31,723
Dept. Store Sales (changes from year ago)[2]	−10%	−3%	−1%
FINANCE			
Bank Clearings (Dun & Bradstreet, millions)	$26,996	$32,758	$24,572
Federal Gross Debt (billions)	$288.0[1]	$288.0	$288.6
Bond Volume, NYSE (millions)	$34.7	$33.1	$26.1
Stocks Sales, NYSE (thousands of shares)	26,026	23,066	15,421
Loans & Investments (billions, adjusted)[3]	$111.5	$111.1	$103.0
U. S. Govt. Obligations Held (billions)[3]	$30.5	$30.3	$25.9
PRICES			
STEEL's Finished Steel Price Index[4]	247.82	247.82	247.82
STEEL's Nonferrous Metal Price Index[5]	218.7	218.7	230.9
All Commodities[6]	119 1	119.3	119.9
Commodities Other than Farm & Foods[6]	127.8	128.0	128.4

*Dates on request. [1]Preliminary. [2]Federal Reserve Board. [3]Member Banks, Federal Reserve System. [4]1935-39=100. [5]1936-39=100. [6]Bureau of Labor Statistics Index, 1947-49=100.

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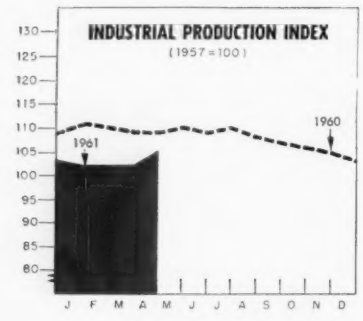
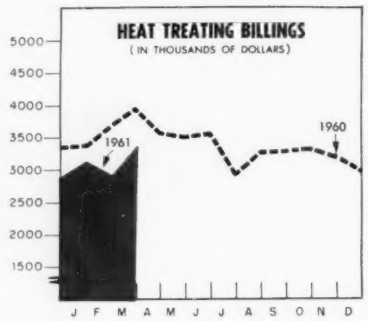
THE BUSINESS TREND





(Seasonally adjusted)

	Total Production		Total Mfg.		Durables Mfg.	
	1961	1960	1961	1960	1961	1960
Jan.	102	111	101	112	95	111
Feb.	102	110	101	110	94	109
Mar.	102	109	102	110	95	108
Apr.	105*	109	105*	109	99*	106
May	...	110	...	110	...	107
June	...	109	...	110	...	105
July	...	110	...	110	...	106
Aug.	...	108	...	108	...	104
Sept.	...	107	...	107	...	102
Oct.	...	106	...	106	...	101
Nov.	...	105	...	104	...	98
Dec.	...	103	...	103	...	96
Avg	...	108	...	108	...	104

Federal Reserve Board. *Preliminary.
Charts copyright, 1961, STEEL.

	1961	1960	1959
Jan.	3,171.6	3,381.6	2,769.1
Feb.	2,942.3	3,698.8	2,828.0
Mar.	3,393.3	3,921.9	3,273.8
Apr.	...	3,552.6	3,316.1
May	...	3,509.4	3,302.8
June	...	3,548.4	3,512.2
July	...	2,899.7	3,302.1
Aug.	...	3,266.0	3,162.8
Sept.	...	3,281.7	3,263.8
Oct.	...	3,306.8	3,531.2
Nov.	...	3,165.5	3,092.2
Dec.	...	2,925.2	3,357.2

Metal Treating Institute.

than filling the holes created in next month's schedules. Result: Steel ingot output this month will top 8 million tons for the first time since last May.

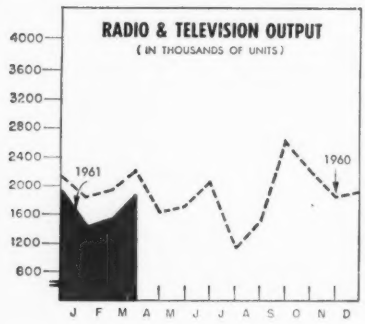
June could be a repeat of the May situation. There is a great deal of optimism in Detroit about the strength of this year's market. For instance, while the official stand of the Ford Motor Co. is that sales will reach 5.8 million units (both domestic and foreign) in calendar 1961, Robert J. Eggert, marketing research manager for the Ford Div., told STEEL: "Six million units is still a distinct possibility."

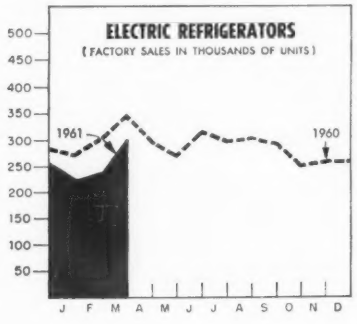
• **Possible Shortage** — One auto market researcher figures it this way: Even if output in both May and June hits the 500,000-unit-a-month pace, dealers' inventories will not be any higher than 850,000 units by June 30. "We can handle that easily," he declares. "In fact, I'm inclined to think we'll underbuild the 1961 models, with some spot shortages developing in the early fall . . . (even though) the new model buildup will be somewhat ahead of last year's."

The new models should stimulate sales in the fourth quarter more than usual, some Detroiters think. The big model change isn't scheduled until the 1963s, but the changes this fall still will be more extensive than they have been in most years. Then, too, some new compacts will be on the market. The developments will add something extra to the fourth quarter—and the momentum will probably carry over well into 1962.

• **Partly Cloudy**—The big question outside the Detroit area is: What about the possibility of an Autoworkers' strike this year? But in the Motor City itself, there is little concern—in comparison with most contract years. Some observers point out that the United Autoworkers' strike fund is fat enough to support a major stoppage. But most feel that Walter Reuther is in a weak bargaining position this year because of major unemployment in Detroit (more than 13 per cent of the labor force) and short hours. Company earnings have not been high, and the current market, while good, is not spectacular.

If there is a strike, the majority opinion favors a short, or token, stoppage. It would have little, if any, effect on total 1961 output because it would come at a time when production is normally low for mod-





	Radio		Television	
	1961	1960	1961	1960
Jan.	1,090	1,356	368	526
Feb.	1,115	1,442	444	503
Mar.	1,384	1,668	497	550
Apr.	....	1,230	...	423
May	....	1,277	...	442
June	....	1,551	...	519
July	....	890	...	269
Aug.	....	1,048	...	462
Sept.	....	1,945	...	679
Oct.	....	1,728	...	500
Nov.	....	1,469	...	430
Dec.	....	1,522	...	405
Totals	....	17,126	...	5,708

Electronic Industries Association.

	1961	1960	1959
Jan.	225,700	272,100	256,200
Feb.	239,000	308,500	306,200
Mar.	300,000	345,000	333,700
Apr.	.....	300,000	301,000
May	.....	273,400	308,200
June	.....	314,700	361,000
July	.....	297,400	370,800
Aug.	.....	307,500	314,100
Sept.	.....	290,700	355,700
Oct.	.....	249,200	329,600
Nov.	.....	258,400	265,900
Dec.	.....	258,100	282,600
Totals	.....	3,475,000	3,785,000

National Electrical Mfrs. Assn.

el changeover. "There will be a lot of fireworks but no fire," declared one businessman.

Detroit's Economy Lags

The nation's recovery is well established, but there are still areas of the country where the impact has been less than hoped for. Such an area is Detroit, which is typical of the cities tied so closely to the auto industry. Despite a modest production comeback, many other aspects of the area's economy are still lagging. Unemployment may decline to about 11 per cent of the labor force this month, estimates T. Donald Rucker, director of economics and research development for the Greater Detroit Board of Commerce. But it probably won't be much better than that for the year as a whole. (Even in the best times, it's close to 7 per cent.)

Part of the current drag in such cities is psychological. Officials of the National Bank of Detroit say that personal savings accounts continue to expand. Credit payoff is slow, although the delinquency rate is declining. Department store sales are sluggish. Housing loans are down. Vacancies are up. Some feel that the recession psychology will not change appreciably until the strike threat is over and new model production assures workers of more steady hours and earnings.

Detroit is gradually getting away from its almost complete dependence on the automotive business—largely because the industry is decentralizing. But it is a long process made more difficult by high wage rates and a labor surplus.

Trends Fore and Aft

• Farmers' income was up from that of the year ago period by 23 per cent in the first quarter, and prospects are for further increases throughout the year, states Robert E. Cogan, assistant economist, Federal Reserve Bank of Cleveland.

• Samuel W. White Jr., president of Oliver Corp., Chicago, says he expects the recent sales pickup in farm equipment to continue through the fall. The spring selling rate for Oliver was 6 per cent above 1960's.

• Ninety-three out of 212 companies reporting to the Gray Iron Founders' Society Inc. expect this month to be better than April, which was about on a par with March. Only 24 expect a decline.

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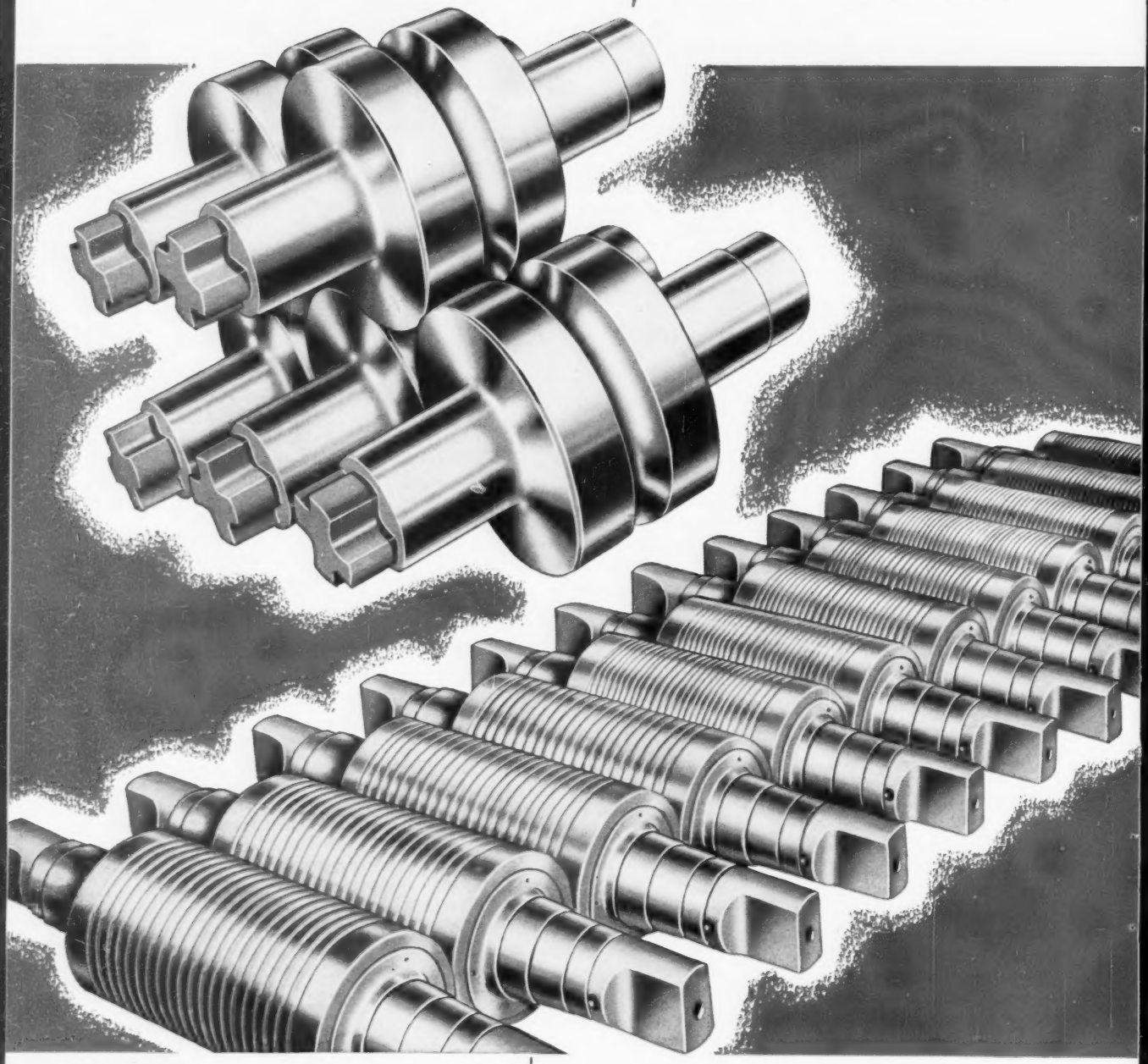

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P&W vice president

JACK E. SMITH
Tescom president

ROBERT C. TREES
Udylite marketing v. p.

Richard S. Moyer was made director of manufacturing, **Link-Belt Co.**, Chicago. He succeeds **Harold L. Hoefman**, retired vice president-manufacturing, whose activities in South Africa and Australia were transferred to the newly formed International Div.

Asa E. Snyder was elected vice president of **Pratt & Whitney Co. Inc.**, West Hartford, Conn. He was director of research, and continues supervision of P&W's Research Dept.

E. Warren Feddersen was made director of manufacturing development at **Convair Div.**, San Diego, Calif., General Dynamics Corp. He succeeds **J. H. Famme**, transferred to the Convair-San Diego Div. as assistant manager-operations.

Robert E. McDowall, vice president of Cohu Electronics Inc., San Diego, Calif., was made general manager of its **Kin Tel Div.** in San Diego.

S. L. Whitehall, general sales manager, **Parish Pressed Steel Div.**, Reading, Pa., Dana Corp., was appointed special assistant to the general manager.

Richard A. Hartman was made vice president and product manager, **Palnut Co.**, Mountainside, N. J., division of United-Carr Fastener Corp.

Frank A. Speer was made vice president and works manager, **Mueller Co.**, Decatur, Ill.

W. Taylor Harper was made sales manager, Enamelstrip Div., Allentown, Pa., **National Steel Corp.**

Tescom Corp., Minneapolis, is the new corporate name of Smith Welding Equipment Corp. Tescom includes two divisions: Smith Welding Equipment Div. and Fluid Systems Div., activated last January. **Jack E. Smith** is president; **L. L. McBurney** chairman. Mr. Smith was executive vice president, Mr. McBurney president of Smith.

Irving Hertzberg was made senior vice president, **Judson L. Thomson Mfg. Co.**, Waltham, Mass. He was assistant to the president.

Drex D. Minshall was named vice president-marketing, **Perfect Circle Corp.**, Hagerstown, Ind.

George Pope was elected vice president-manufacturing, **Hubbard & Co.**, Chicago. He was manufacturing manager.

Ralph E. Bevis, corporate director of research, **Ferro Corp.**, Cleveland, was elevated to corporate vice president.

John P. Sharp was named Western regional manager, **Denison Engineering Div.**, American Brake Shoe Co. He has headquarters in Hawthorne, Calif., where he succeeds **V. P. Preidis**, transferred to a market development post with the Denison Div. of Brakeshoe International S. A. in Switzerland.

G. D. Griffin was made manager of the newly formed Sales Engineering Dept. at **Eaton Mfg. Co.'s** Axle Div., Cleveland. He was Cleveland district sales manager for the division.

Robert C. Trees was named vice president-marketing, **Udylite Corp.**, Detroit. He was director of advertising.

C. R. Stone, chief production engineer, **Potter & Brumfield Div.**, Princeton, Ind., American Machine & Foundry Co., was made director of production.

Thomas I. Moore was made vice president and manager, **Monsanto Electrolytic Div.**, Monsanto, Ill., American Zinc Co. of Illinois, subsidiary of American Zinc, Lead & Smelting Co.

W. R. Ramsay was elected first vice president, **North American Refractories Co.**, Cleveland. He was vice president - administrative. **E. A. Williams Jr.**, former operations manager, was elected vice president-operations. **Frederic W. Schroeder** was elected vice president-research.

Robert S. Handly was elected vice president - manufacturing, **Continental-Diamond Fibre Corp.**, Newark, Del., subsidiary of Budd Co.

Edward F. Koglin fills the new post of director of development at **G. E. Smith Inc.**, Pittsburgh.

Donald B. Black was named assistant manager-chemicals purchasing, **Dow Chemical Co.**, Midland, Mich.

Gerald J. Posakony was elected vice president in charge of Research and Magnetics Divisions in Boulder, Colo., for **Automation Industries Inc.** **Dale E. Miller** was elected vice president in charge of Mid-

C. CLAY CRAWFORD

FORDYCE COBURN

Colorado Fuel & Iron appointments

CARL MUELLER

JOHN RENNER

Lincoln Engineering management promotions

Continent Divisions, Tulsa, Okla., and Abilene, Tex.

C. Clay Crawford was made works manager, Pueblo, Colo., plant, **Colorado Fuel & Iron Corp.** He was superintendent of the seamless tube mill. **Fordyce Coburn** was made director of purchases for the corporation in Denver.

Philip C. Ross fills the new post of engineering manager, Switch Devices Section, **Electro-Tec Corp.**, South Hackensack, N. J. He was with General Electric Co.

O. L. Wigton was named president, **Cleveland Formgrader Co., Bosworth Mfg. Co.**, and **Power Development Co.**, with headquarters at Avon, Ohio. **Glen A. Mooney** resigned as president to devote full time as president of Mooney Tractor & Equipment Corp., Milwaukee.

William I. McClelland was made general sales manager, **Winter Bros. Co.**, Rochester, Mich., tap and die division of National Twist Drill & Tool Co.

Edwin R. Stroh was named general sales manager-automotive and marine of the new Motorcraft Div. of **Ford Motor Co.**, Dearborn, Mich. He was vice president and director of sales for Electric Autolite Co.

Alden C. Hensel, former works manager, was elected vice president-manufacturing, **Mueller Brass Co.**, Port Huron, Mich. **Frank B. Rote** was elected vice president-technical director.

Marshall E. Monroe Jr., director of procurement, was elected a corporate vice president of **Motec Industries Inc.**, Hopkins, Minn. **David E. Thorn** was made materials engineer, Engineering & Research Div.

Fred W. Beitner was appointed vice president-sales, **Trent Tube Co.**, East Troy, Wis., subsidiary of Crucible Steel Co. of America. He was general sales manager.

Lincoln Engineering Co., St. Louis, division of McNeil Machine & Engineering Co., named **Carl Mueller** general manager; **John Renner** general sales manager.

James A. Stewart was elected president of **Continental Can Co. of Canada Ltd.**, Toronto, Ont. He succeeds the late **Frank A. Whittall.**

John F. Thurston, vice president-special projects, **General Dynamics Corp.**, was named a senior vice president of the corporation, and president of its Liquid Carbonic Div., with headquarters in Chicago. As president of the division, he succeeds **Rex L. Nicholson**, resigned.

Harry G. Brustlin, former manager of marketing services, was named general sales manager of **Norton Co.'s** Abrasive Div., Worcester, Mass., a post vacant since **Robert Cushman** became vice president-general manager last January.

Robert S. Miltenberger was made manager - technical development,

WILLIAM I. McCLELLAND

Winter Bros. gen. sales mgr.

MARSHALL E. MONROE Jr.

Motec Industries v. p.

FRED W. BEITNER

Trent Tube v. p.-sales

HARRY G. BRUSTLIN

Norton-Abrasive Div. sales

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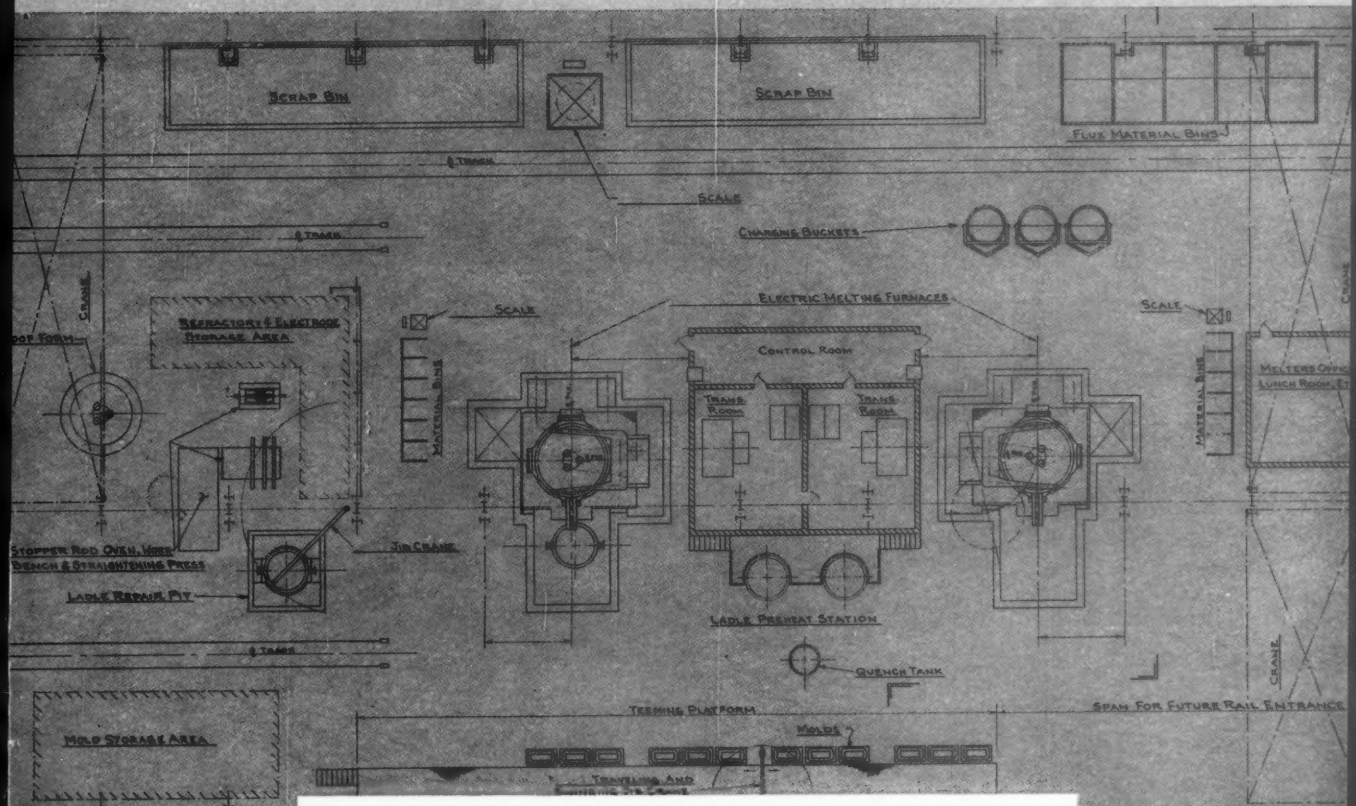

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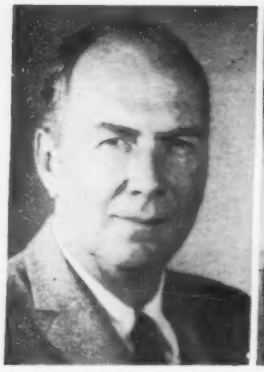

WILLIAM M. MAYBERRY
Bethlehem asst. gen. sales mgr.

WALTER L. LONGNECKER
heads new AS&W dept.

GABRIEL C. DANCH
Western Design v. p.

ROBERT H. ETNYRE
Nat'l Supply works mgr.

ROBERT W. YOUNG
Chambersburg Eng. p. a.

CHARLES YAKER
Misco v. p.-mfg.

CHARLES G. GOULD
Felker Mfg. gen. mgr.

MELVIN F. HOUSE
Michigan Seamless Tube post

JOHN M. WILSON
Bostitch gen. sales mgr.

Great Lakes Steel Corp., Detroit, a division of National Steel Corp.

Charles G. Gould was named general manager of **Felker Mfg. Co.**, Torrance, Calif., subsidiary of Bay State Abrasive Products Co.

Robert E. Daniels was made sales manager, **Schaevitz Engineering**, Pennsauken, N. J.

Melvin F. House was appointed production manager, **Michigan Seamless Tube Co.**, South Lyon, Mich. He was plant superintendent.

John M. Wilson, sales manager, was promoted to general sales manager at **Bostitch Inc.**, East Greenwich, R. I. He succeeds **James M. Nestor**, resigned.

William M. Mayberry was appointed assistant general sales manager, **Bethlehem Steel Co.**, Bethlehem, Pa. He is succeeded by **Harris I. Stanton** as sales manager, tin mill products.

Walter L. Longnecker, former Cleveland district operations manager, was made director-engineering and research, heading a new department at **American Steel & Wire Div.**, Cleveland, U. S. Steel Corp. **Dr. Raymond B. Hoxeng** was made director of research. He was assistant to the director of U. S. Steel's applied research laboratory at Monroeville, Pa.

Gabriel C. Danch was appointed a vice president, **Western Design & Electronics Div.**, U. S. Industries Inc. He is in charge of operations at Silver Springs, Md. He was manager of the Washington office of USI.

Robert H. Etnyre was made works manager at the Houston plant of **National Supply Div.**, Armco Steel Corp., to succeed **George S. Leonard**, resigned. **John O. Miller** succeeds Mr. Etnyre as works manager, Gainesville, Tex., plant.

Robert W. Young was named purchasing agent of **Chambersburg Engineering Co.**, Chambersburg, Pa. He succeeds **W. Hastie Derbyshire**, retired.

Charles Yaker was made vice president-manufacturing at **Misco Precision Casting Co.'s** plants in Whitehall and Muskegon, Mich. **Ajax Vartanian** was made manager of the Muskegon plant.

Joseph J. Finnegan heads a new Product Planning Dept. at **Graver Tank & Mfg. Co.**, Chicago, division of Union Tank Co.

Lloyd A. Amos and **Alanson L. Brooks** were named vice presidents, International Div., **Kaiser Aluminum & Chemical Corp.**, Oakland, Calif.

OBITUARIES...

Oscar H. Jung, 76, president and founder, **Trico Fuse Mfg. Co.**, Milwaukee, died May 5.

Edward H. McGraw, Eastern district sales manager for the Chain and Electrode Divisions of **McKay Co.**, New York, died Apr. 18.

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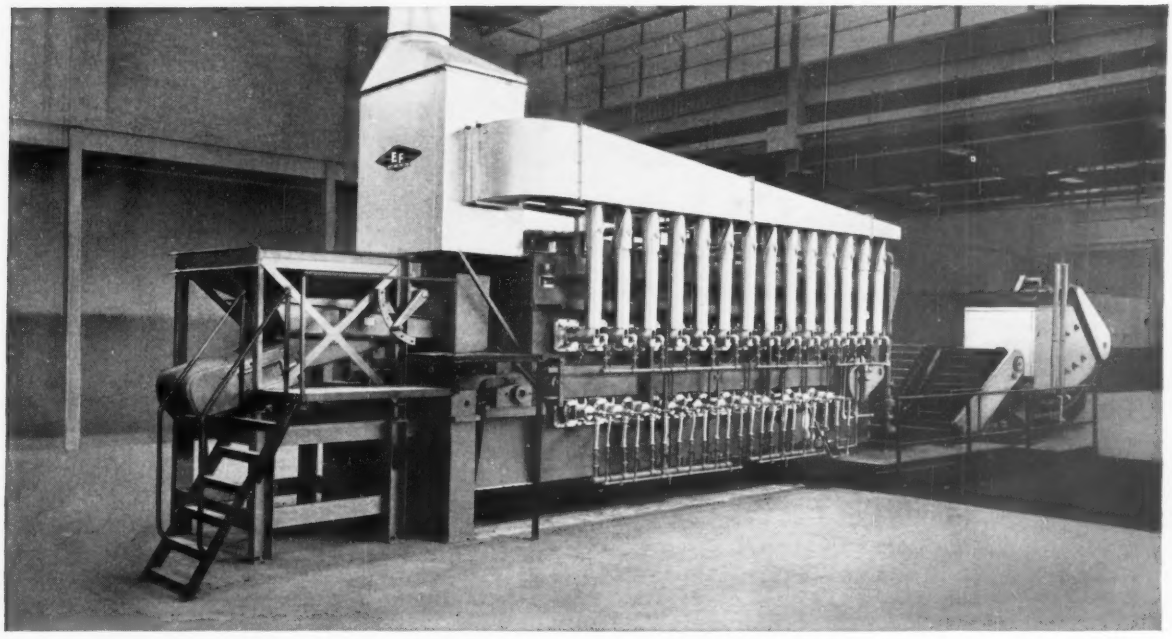
Chain Belt Furnaces

for scale-free hardening, carbon restoration, carburizing, carbon nitriding or non-decarb heat treating of small and medium size parts.

EF Chain Belt Conveyor Furnaces are ideally suited for processing a wide variety of products in a wide range of atmospheres. Their initial cost is moderate. Operation is almost completely automatic, minimizing labor costs. The material is carried directly on the belt without shaking or jarring. No pans or trays are needed, thus avoiding the necessity of heating this additional weight, and assuring high fuel economy.

Available in electrically heated or fuel fired designs. 15 standardized sizes with capacities from 175 to 3000 lbs. per hour, minimize the charges for new engineering and assure prompt delivery. Easily installed. Often shipped completely assembled requiring only connection to utilities. 7 out of every 10 new orders are from previous users attesting the serviceability and dependability of our design.

Write for Bulletin No. 601. It gives full details . . . and call the EF engineers on every heat treating project. Our long experience and extensive research and development facilities can shorten your path to low cost, profitable operation.



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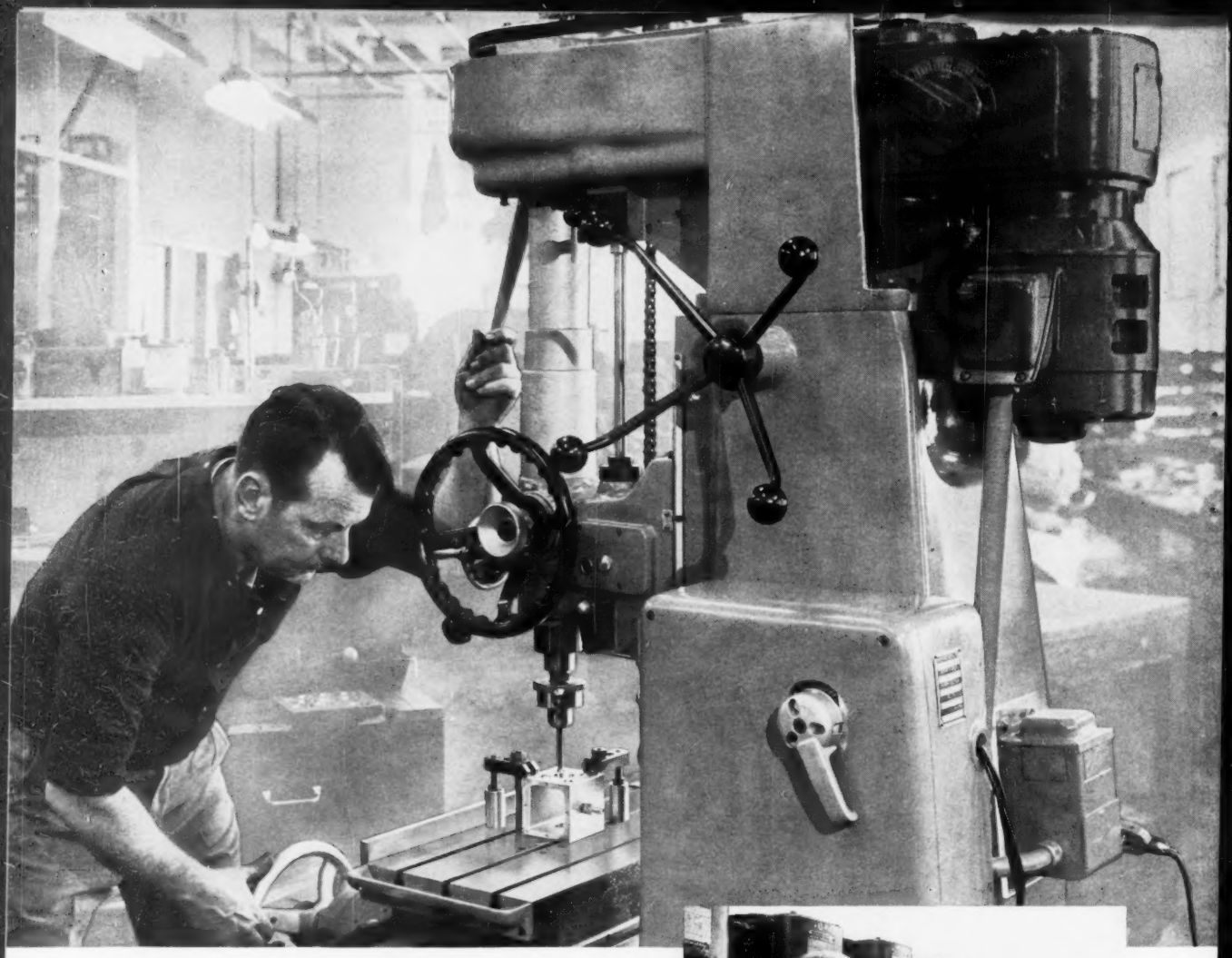
SALES REPRESENTATIVES—2842 West Grand Blvd., Detroit 2, Mich. • also 968 Coleman Rd., Cheshire, Conn.



Mr. A. A. Lindberg, Design Engineer,
Moore Special Tool Co., Inc. states:

"On our Model 1½ Jig Borer...

General Electric Polydyne® Drives Help Us Maintain 0.000070"* Accuracy"

"Efficient control of vibration is the reason that the majority of our Model 1½ jig borers are equipped with General Electric Polydyne drives. Competitive drives have never fully solved this problem," states A. A. Lindberg, Design Engineer for Moore Special Tool Co., Bridgeport, Connecticut.

"Moore tests each Polydyne drive on a specially constructed bracket," continued Mr. Lindberg. "Vibration readings are taken at three points, and every Polydyne drive tested has been under the vibration limit of 0.001 inch and virtually free of operating noise.

"Another reason that our Model 1½ has proved popular is that the Polydyne drive gives an infinite number of operating speeds with just a simple adjustment of the dial to the desired rate."

When your application requires low-cost adjustable speed combined with reliability and ease of maintenance, investigate G-E Polydyne drives. Your General Electric Sales Engineer has full details. Or, write for bulletin GEA-6806, Section 854-06, General Electric Company, Schenectady 5, N. Y.

* Seventy Millionths

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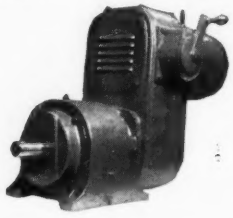
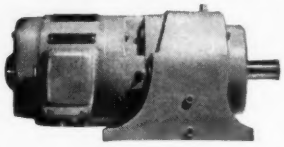
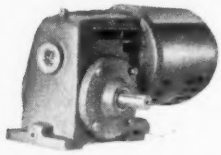


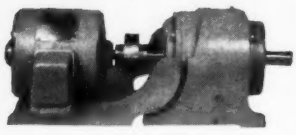
General Electric Polydyne Drive



Integral-type Gear Motor

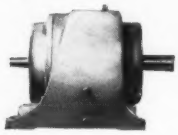


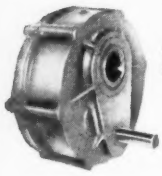
Right-angle Shaft Gear Motor



All-motor Gear Motor

Footed Speed Reducer





Shaft-mounted Speed Reducer

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GENERAL ELECTRIC

Steelmakers Intensify Research, Development Work

POTENTIAL GROWTH in the economy in the next decade will be attained only if industry can find and invest an estimated $560 billion for expansion and improvement. That observation was made by T. F. Patton, president and chief executive officer of Republic Steel Corp., Cleveland, at the annual stockholders' meeting in Flemington, N. J.

In discussing his firm's $375 million program of capital expenditures, Mr. Patton said Republic's bright annealing line for stainless steel sheets and strip at the Massillon, Ohio, plant has just been completed. "Demand is building up so substantially, we have decided to construct a second and larger unit," he said.

The company's new, 8 in. stainless and alloy bar mill in Canton, Ohio, is in limited operation, and work on the Warren, Ohio, strip mill and related facilities is on schedule. The hot strip mill itself (the key unit of these facilities) went into production May 15. Threading through all of Republic's activities to meet customer needs and improve profitability is a growing emphasis on research. Mr. Patton said the company has made notable gains in operating efficiency and is making satisfactory progress in product research.

Demand for Republic's new X-Tru-Coat (plastic coated steel pipe) has risen. The company has three lines that produce it in operation. Republic will soon announce a new tubular product coated on the inside with a similar material, Mr. Patton said.

The company also has a number of promising new steels in the testing stage, including: Ultrapure alloy steels, high strength wire, an alloy steel that retains a high degree of stability at high heat, and another alloy steel which can be heat treated to great strength yet retains excellent ductility.

"For the longer range," Mr. Patton said, "we are exploring the fundamental secrets of metal structure, of materials, of fuels and energy, and of processes. We believe we have only begun to explore the full potential of steel as a basic metal and that the future of steel alloys is almost unlimited."

• **New Research Emphasis**—Youngstown Sheet & Tube Co., Youngstown, is also intensifying its research and development work. Dr. Karl L. Fetters, vice president-research and development, announces a staff expansion, including the addition of seven research specialists, and reorganization. Recent appointments include: R. H. Frazier, manager of applied research; J. W. Lodge, acting supervisor, new product development; Dr. M. C. Chang, supervisor of raw materials research; Dr. R. P. Morgan, supervisor of physical metallurgy; Dr. J. M. Uys, supervisor of iron and steelmaking; and J. L. Bayer, research engineer in mineral petrography. George H. Denton has been named assistant supervisor of raw material research.

W. R. Patterson, a research engineer, is doing product research; H. J. Oberson, also a research engineer, is assigned to special duties in the raw materials section under Dr. Chang.

Wheeling to Build Plant

Wheeling Corrugating Co., subsidiary of Wheeling Steel Corp., Wheeling, W. Va., will construct a culvert fabricating and bituminous dipping plant in Havana, Ill. Cost: About $500,000. James A. Holloway, vice president of Wheeling Corrugating, says the plant is scheduled for completion this fall.

RCA Builds Plant Addition

Radio Corp. of America, New York, has added 20,000 sq ft to its Needham, Mass., plant. The manufacturing operation was doubled to help meet increasing demands for complete memory systems and associated components required by the

(*Please turn to Page* 106)

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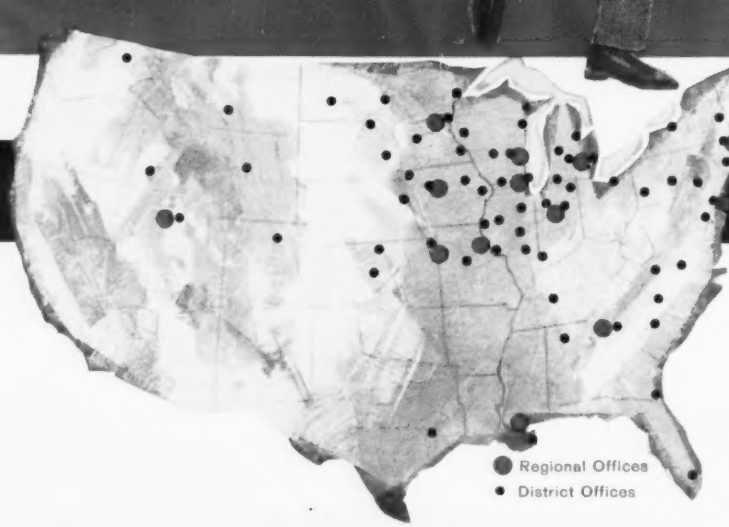

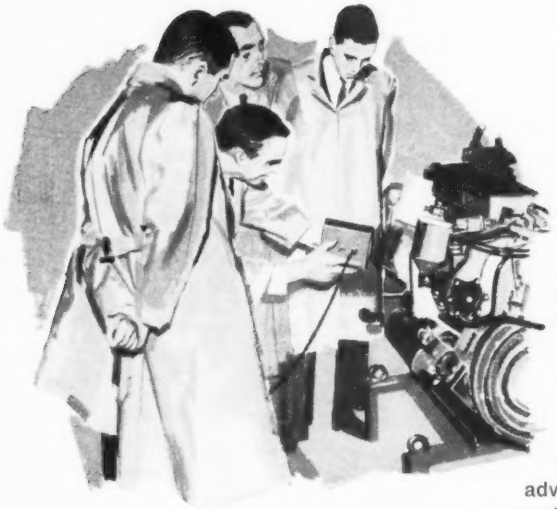

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(*Concluded from Page* 103)
electronic data processing industry, says Dr. F. E. Vinal, manager, Memory Products Operation, RCA Semiconductor & Materials Div.

Litho-Strip Enlarges Plant

Litho-Strip Corp. has completed a $2 million expansion program in its Chicago plant. The project included installation of a continuous process line for precoating aluminum and steel coils. R. M. Thornton has been appointed vice president in charge of research and development, R. J. Kieckhefer Jr. vice president in charge of administrative matters and engineering.

Alumicast Div. Formed

Gale Mfg. Co., Albion, Mich., has formed an Alumicast Div. which will have facilities for production of sand, permanent mold, and shell molded aluminum castings. The division will specialize in castings covering a wide range of aluminum alloys cast to intricate cored design. Initial daily capacity for melting aluminum will be 9600 lb. The plant (North Gale Foundry) comprises 30,000 sq ft of floor space. Arthur Chenoweth is manager of the division. The firm's Grey Iron Div. has facilities for daily production of 100 tons of sand cast and shell molded castings.

Sharon Steel Expands

Sharon Steel Corp., Sharon, Pa., has doubled its facilities for the production of Galvanite (a hot depth, zinc coated strip steel for automotive, appliance, and architectural applications). The increase in capacity was achieved by expanding existing furnaces 100 ft and installing auxiliary equipment, including gas generators, compressors, and storage facilities.

Plans Plant Addition

Addressograph-Multigraph Corp., Cleveland, plans an addition to its main plant on Babbitt Road in Euclid, Ohio, which will provide a 42 per cent increase in manufacturing and storage space.

Bethlehem Buys Furnaces

Bethlehem Steel Co. will install three carburizing and nitriding furnaces and one car type furnace at its Bethlehem (Pa.) plant. Contract for the furnaces has been awarded to Amsler Morton Co., Pittsburgh.

The carburizing and nitriding furnaces will be capable of carburizing a 7000 lb charge at a maximum temperature of 1900° F, or of nitriding at temperatures near 1050° F.

The car furnace will be suitable for heating a 10 ton charge of miscellaneous castings and forgings from room temperature to 1750° F.

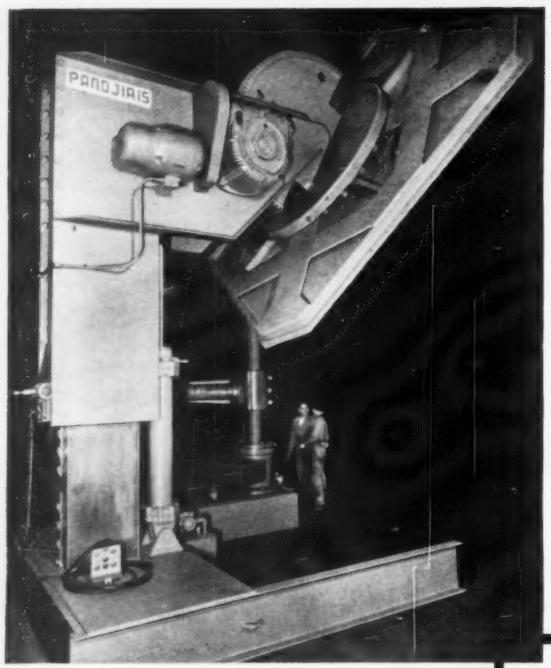
India Gets Bearing Plant

An automotive bearing plant will be constructed in Madras, India, by a partnership that includes Clevite Corp., Cleveland; Repco Ltd. (a Clevite licensee), Australia; and India Pistons Ltd., Madras, India. The operation will be known as Bimetal Bearings Private Ltd. In addition to its investment, Clevite will provide technical assistance in the design, construction, and operation of the plant.

Sheffield to Get Filters

Two major dust collector installations have been ordered by Sheffield Div., Armco Steel Corp., for installation at its Kansas City, Mo., and Houston plants. The collectors will be made by Western Precipitation Div., Los Angeles, Joy Mfg. Co.

Sheffield has two electric arc furnaces at each of its Kansas City and Houston plants. The Therm-O-Flex units will clean a total of 270,000 cfm with an efficiency rated at virtually 100 per cent.



Position of the work is mighty important when welding. This 20-ton capacity positioner tilts, rotates and elevates automatically. Two standard Cone-Drive **double-enveloping worm** gear reducers provide the drive and tuck away compactly under the table.

Compact Cone-Drive gearing is available in gearsets, speed reducers and gearmotors.

Put 20 tons where you want it

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NEW ADDRESSES

United States Drill Head Co. has consolidated its entire manufacturing and administrative operations in three new plant and office buildings at 5298 River Rd., Cincinnati, Ohio. The newest structure rounds out a $750,000 building program begun in 1957.

John A. Roebling's Sons Div., Trenton, N. J., Colorado Fuel & Iron Corp., will move its New York

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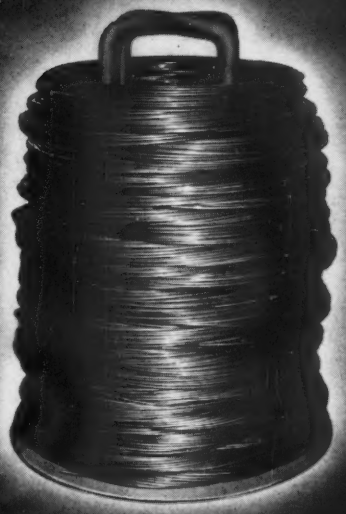
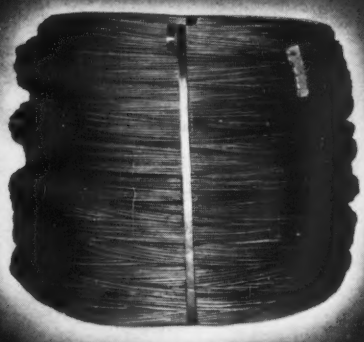


comes in Continental's cost-saving packages



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Econo-Coil® Reel unwinds 1500# to 2500# *nonstop*, depending on finish and gage . . . the single length wire that slashes stop-and-go coil changing time, and cuts scrap loss as much as 90 percent! Econo-Coils® are shipped on returnable reels which stack for easy handling when full, or nest when empty to save space.

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Econo-Coils® can be furnished in a wide range of gages, in many finishes, tempers, and analyses of low and medium low carbon steels. Let us show you how we have helped others speed output and cut production costs . . . with Econo-Coil.®

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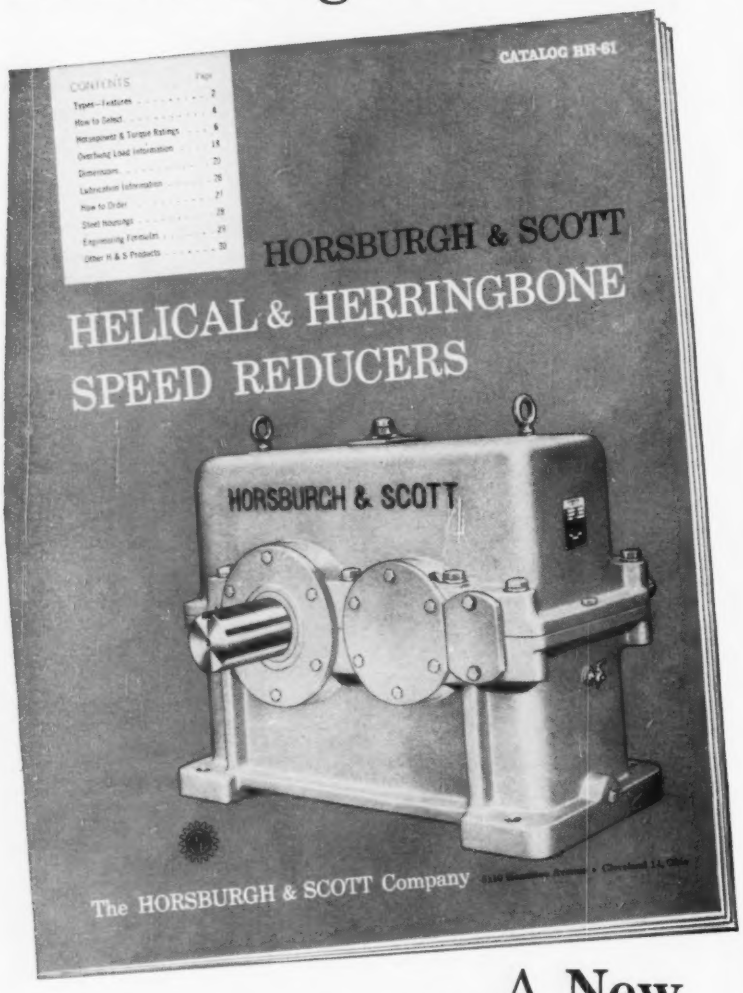

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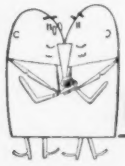
and Philadelphia offices June 1 to new quarters at Adams Station, near New Brunswick, N. J.

ASSOCIATIONS

Lead Industries Association re-elected these officers: President and chairman, Jean Vuillequez, American Metal Climax Inc.; secretary-treasurer, Robert L. Ziegfeld; and vice presidents, J. A. Costello, Ethyl Corp.; C. R. Ince, St. Joseph Lead Co.; and Simon D. Strauss, American Smelting & Refining Co., all of New York.

Ellard W. Yeo, Warehouse Div., Dominion Bridge Co. Ltd., Montreal, Que., has been elected president of the newly formed **Eastern Canada Chapter, Canadian Steel Warehouse Association.**



CONSOLIDATIONS

Pacific Foundry & Metallurgy Co., San Francisco, purchased **C. O. Bartlett & Snow Co.**, Cleveland, fabricator of mechanized foundry equipment and manufacturer of dryers, calciners, kilns, coolers, and elevating and conveying equipment for handling bulk materials. The company also offers a specialized line of grain and feed mill equipment. The new corporation will be known as Bartlett-Snow-Pacific and will operate the San Francisco and Cleveland plants as divisions.

Boice Gages Inc., Hyde Park, N. Y., acquired the **Reli-A-Chek Corp.**, Santa Maria, Calif., manufacturer of gages. Boice makes precision measuring instruments. The California firm will be renamed Reliant Gages Inc.

Fairbanks, Morse & Co., Chicago, purchased **Herold Radio & Electronics Corp.**, Yonkers, N. Y. Headquarters of two Fairbanks, Morse divisions — Electronics Div. and Scale Div.—will be consolidated at the 120,000 sq ft plant and office building at 100 Electra Lane, Yonkers, N. Y. A number of general administrative functions of the com-

"The superior quality is evident at first glance . . .

. . . that's why we recently decided to stock ***LUSTERIZED***® *cold finished steel bars"*

SAYS J. T. ERWIN, VICE-PRESIDENT OF ELLIS-ERWIN SUPPLY CO., INC., TAMPA, FLA., who stands in the group at the right with J. E. Ellis, Jr., Sales Manager, W. Gray Ellis, Purchasing Agent and E. C. Cox, Office Manager.

BLISS & LAUGHLIN LUSTERIZED bars are immediately distinguishable from ordinary cold finished steel bars in the racks at Ellis-Erwin, Mr. Erwin reports. Mr. W. Gray Ellis and Mr. Erwin are shown checking the close tolerance and superior finish of a Lusterized bar.

THE SAVINGS that can be realized during production with Lusterized Finish bars are figured by Mr. Erwin and Mr. Ellis.

When a long-established steel service center decides to concentrate on selling a particular line of cold finished steel bars, the bars obviously must be superior.

That is precisely why Ellis-Erwin Supply Co., Inc., Tampa, Fla., selected Bliss & Laughlin Lusterized Finish steel bars.

Mr. J. T. Erwin, Vice-President, writes: "We intend to expand our cold finished sales considerably in 1961. There is a marvelous opportunity in our area with your products. The exclusive quality-pluses and the fast service you render will help us achieve our goal of furnishing the best products to our customers . . ."

This is another example of why more progressive steel service centers stock and recommend Bliss & Laughlin Lusterized Finish bars than any other cold drawn bars.

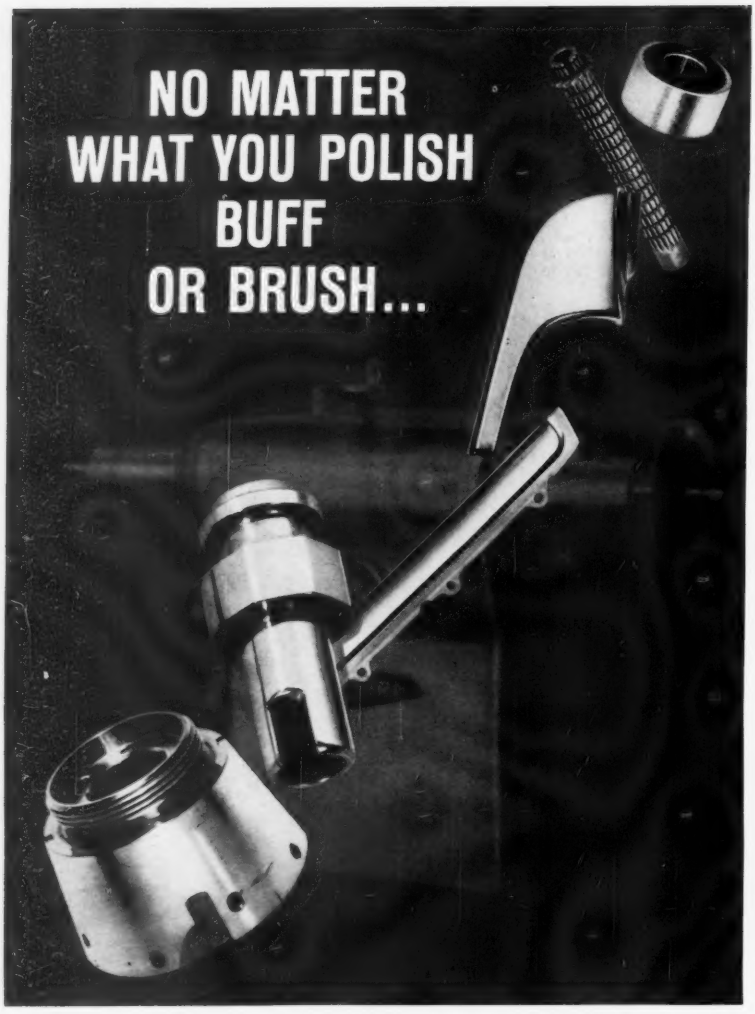
BL-613

Leading Independent Producer of Cold Finished Steel Bars

BLISS & LAUGHLIN

GENERAL OFFICES: Harvey, Ill. • MILLS: Harvey, Detroit, Buffalo, Los Angeles, Seattle, Mansfield, Mass.

Specialists In Finish, Accuracy, Straightness, Strength and Machinability



NEW OSBORN POLISHING/BUFFING LATHES . . . these compact, variable speed lathes are Osborn-engineered to handle your work economically at highest efficiency. Available with balanced single or double spindles, fixed or variable speed ranges from 600 to 3600 rpm. Variable speed lathes have 3-to-1 speed range. Choice of 3, 5 or 7½ hp motors. Other features include: motor-mounted magnetic disc brakes for instantaneous spindle stopping. Roto-Cone drive for instant, vibration-free power transmission and speed changes.

FREE BULLETIN 620 includes complete specifications, operating and construction details plus application data. For your copy, write or call *The Osborn Manufacturing Company, Dept. S-35, Cleveland 14, Ohio. Phone ENdicott 1-1900.*

Metal Finishing Machines
. . . and Finishing Methods
Industrial Brushes
Foundry Production Machinery

OSBORN

pany will also be centered there. Roland J. Kalb has been named vice president and group executive in charge of the two divisions.

Beloit Tool Corp., Beloit, Wis., acquired **Walter T. Cole Tool Co.,** Scottsdale, Ariz., manufacturer of tungsten carbide cutting tools. The Arizona firm will be operated as a subsidiary and its plant will be expanded soon.

S. H. Pomeroy Co., Stamford, Conn., purchased the **Fitzgibbons Boiler Co.,** New York. R. D. Cross, president of the Pomeroy firm, says the Fitzgibbons operation (which includes a plant at Oswego, N. Y.) will be expanded.

Airpax Electronics Inc., Cambridge, Md., purchased **Deeco Instruments Inc.,** Van Nuys, Calif., producer of filters and toroidal components.

Cooper-Bessemer Corp., Mt. Vernon, Ohio, purchased **Kline Mfg. Co.,** Galena, Ohio, manufacturer of hydraulic pumps and motors. W. L. Kline will continue as president of Cooper-Bessemer's new subsidiary.

NEW PLANTS

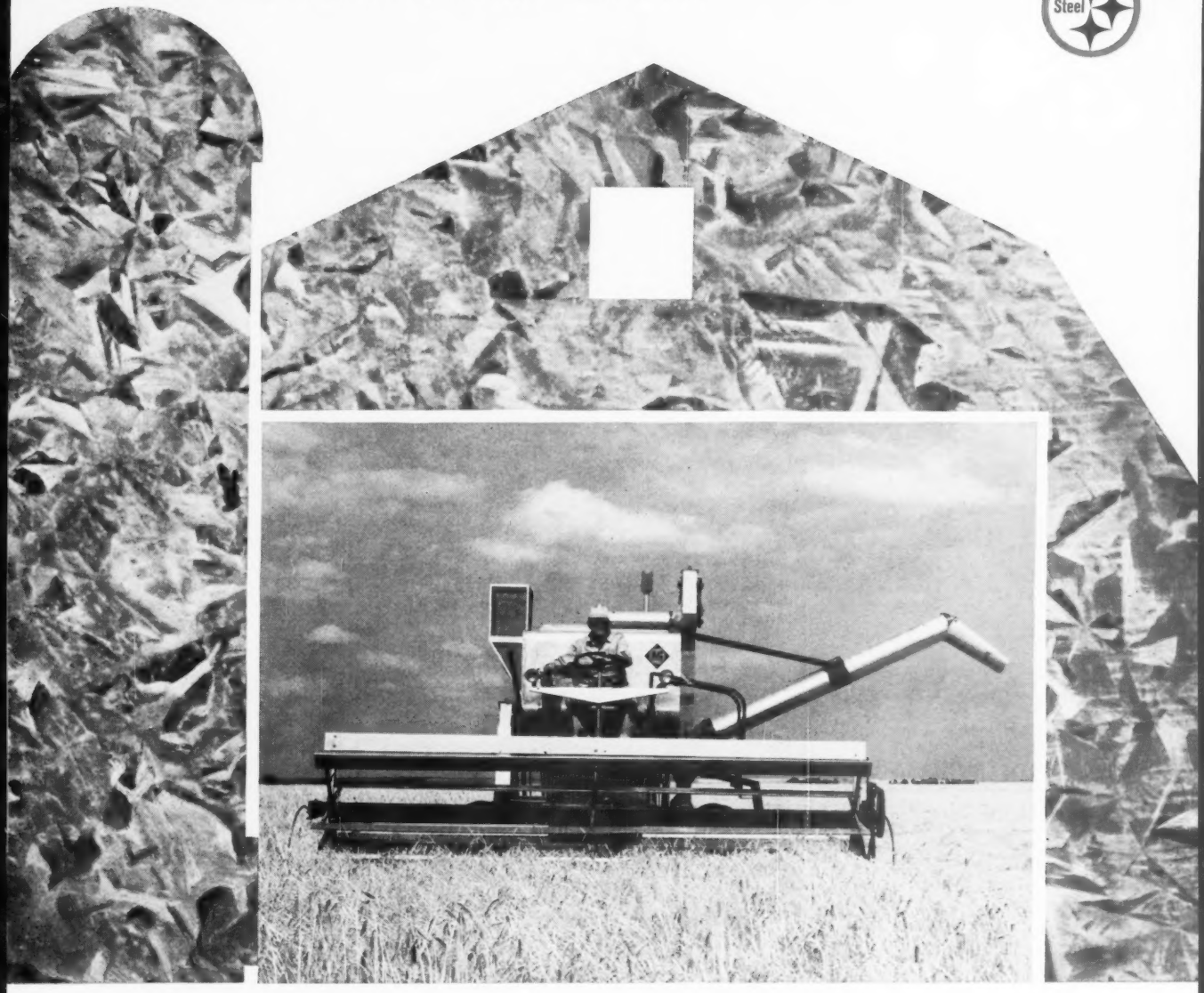
Southern Galvanizing Co. is erecting a 25,000 sq ft office and warehouse facility at Cowen and Whistler Avenues, Baltimore, Md.

Whitehead Metals Inc., New York, established a sales office and warehouse in Meadows Industrial Park, Woodlawn (Baltimore), Md., under the management of D. G. Pettigrew. The company is a subsidiary of International Nickel Co. Inc., New York.

Harper Everlasting Fastenings Ltd., subsidiary of H. M. Harper Co., Morton Grove, Ill., opened a warehouse at 8469 Eighth Ave., Montreal, Que. Nonferrous and stainless steel fasteners will be stocked at the new facility.

H. H. Robertson Co., Pittsburgh, will begin production of building products in a new plant in Stockton, Calif., by midyear. The plant will be headed by D. J. Haack.

Allis-Chalmers combines fend off corrosion . . .



GUARDED BY GALVANIZED STEEL

When you see a big Allis-Chalmers combine like this cutting grain on the farmlands of America you can be sure that galvanized steel has been used in its construction.

Reasons? First, galvanized steel provides excellent weather protection and low maintenance cost. Neither dew nor drizzle nor drenching rain will find a chink in its zinc coating. That holds true regardless of the severity of the fabricating steps to which it may be subjected. And in addition to its corrosion resistance, galvanized steel has a lot of resistance to high cost: It's easy and economical to fabricate, construct and maintain.

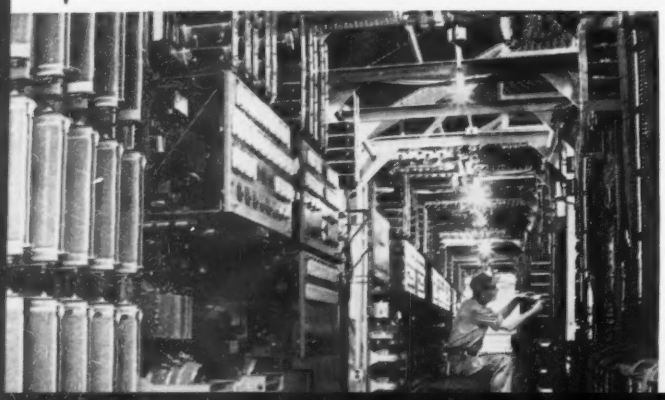
WEIRKOTE® IN PARTICULAR! The galvanized steel used in these combines is National Steel's Weirkote. To the inherent strength, economy and versatility of steel, Weirkote adds enduring zinc protection via the modern continuous process. As a result, Weirkote can be worked to the very limits of the steel base without chipping or peeling. And it assures you of long-lasting protection against corrosion. It is manufactured by two National Steel Corporation divisions, Weirton Steel and Midwest Steel. Write Weirton Steel Company, Weirton, West Virginia, for further details.

MIDWEST STEEL
Portage, Indiana

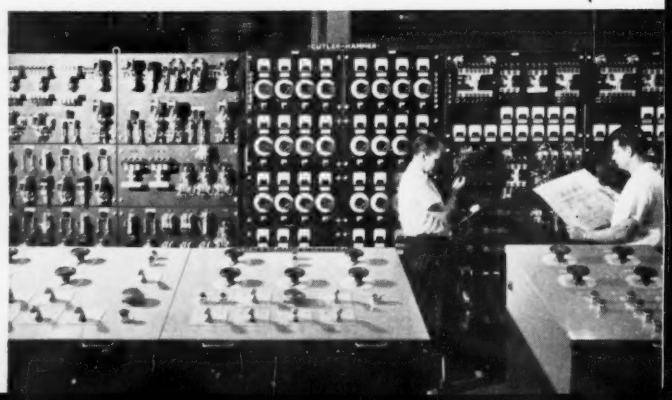
WEIRTON STEEL
Weirton, West Virginia

divisions of
NATIONAL STEEL CORPORATION

Call in the C-H man early! Broad experience in all phases of systems control design means the Cutler-Hammer man brings a knowledgeable eye to your particular control problems. Whether your requirements call for a unique solution, as this Granite City job did, or a more standardized system, call Cutler-Hammer.



Cutler-Hammer Test Floor. Here, complete factory tests of systems control prior to shipment insure faster installation, more trouble-free start-ups. Analog computer-simulator can test engineering solutions before construction; simulate response of any motor or machine to aid in actual factory tests.



CONTROL

What's new in systems control?

New Cutler-Hammer synchro tower position control smooths operation of Granite City tinning line

New approach provides stepless tower movement, cuts maintenance required by older systems

Stepless control over the entire range of tower movement is provided for the first time in the steel industry by Cutler-Hammer. In addition, a continuous visual indication of the exact looper position is always available to the operator.

Both entry and exit towers of the tinning line at Granite City Steel Company in St. Louis utilize this new synchro control.

Less Maintenance

Synchro control eliminates the steps, and greatly reduces the amount of maintenance commonly associated with photoelectric tower control systems. Results? Better control, smoother operation of entry and exit sections, which is echoed in better control of the tinning and cleaning section and of the entire line.

The tinning section is where accurate and synchronized speed regulation provided by the systems control engineer contributes to obtaining the ultimate in tin coated strip.

The complex array of continuous process equipment on the Granite City line is driven by 85 D-c motors totalling 1044 hp and is powered by 13 D-c generators. These 98 rotating machines are tied together by a control system which includes 15 static type regulators to insure superior line performance.

Among the reasons for recent Cutler-Hammer achievements in continuous process control is a standard factory pretest procedure, plus an analog computer-simulator that can help engineers test solutions before construction. *You get more benefits when you call in your Cutler-Hammer systems man early in your planning.*

What's new at Cutler-Hammer?

Recent leadership in tinning line control is matched by other Cutler-Hammer systems automation in dozens of continuous process lines. Look for more "firsts" from Cutler-Hammer . . . we've geared up with new production facilities, new engineering talent . . . a *new desire* to help the primary metals industry meet the challenge of the sixties! Call in your Cutler-Hammer man early in your planning.

WHAT'S NEW? ASK...

CUTLER-HAMMER

CONTROL

Cutler-Hammer Inc., Milwaukee, Wisconsin • Division: Airborne Instruments Laboratory • Subsidiary: Cutler-Hammer International, C. A. • Associates: Canadian Cutler-Hammer, Ltd.; Cutler-Hammer Mexicana, S. A.

Announcing

A Major "Break-Through" In Cutting Fluid Performance

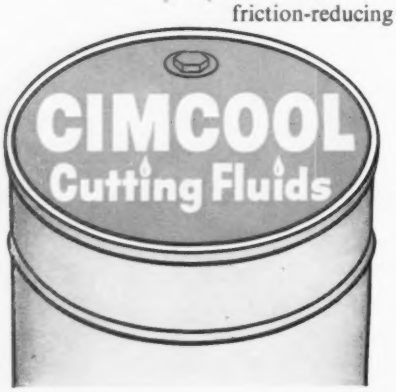
FIVE-STAR

★ ★ ★ ★ ★

CIMCOOL

From the Research Laboratories and Production Proving Grounds of Cincinnati Milling Comes This Remarkable New Product With These Proven Advantages:

1. **TROUBLE-FREE.** At lean, low-cost dilutions, Five-Star CIMCOOL goes into your machines and *stays put with no problems!* It lasts a long time and is extremely dependable.
2. **NO ODORS.** New bactericides keep Five-Star CIMCOOL in operation *four to six times* as long as other fluids.
3. **EXCEPTIONAL RUST PROTECTION.** Two different types of rust inhibitor in this *single-mix* concentrate provide up to 300% more rust control. This rust-control ability permits leaner dilutions, saves you money.
4. **CLEAN AND SAFE.** Five-Star CIMCOOL is just as clean as fresh, clear water to work in. It feels, smells and looks good. It will not smoke or catch fire. Good reasons why operators like it.
5. **LENGTHENS TOOL LIFE.** Production tests prove this new concentrate is second to none in providing *non-stop production*, because of its exclusive CIMCOOL EP, friction-reducing chemicals.



FOR 100% OF ALL METAL CUTTING JOBS

Production-Proved products of The Cincinnati Milling Machine Co.

FIVE-STAR CIMCOOL—Newest in the industry-proven line of CIMCOOL° Cutting Fluids.
CIMPERIAL° — Heavy duty replacement for cutting oils in those low-speed tough jobs.
CIMPLUS — The transparent grinding fluid which provides exceptional rust control.
CIMCUT Concentrates (AA, NC, SS) — For every job requiring an oil-base cutting fluid.
ALSO—CIMCOOL Tapping Compound—CIMCOOL Bactericide—CIMCOOL Machine Cleaner.

For full information on the complete family of CIMCOOL Cutting Fluids, call your CIMCOOL Distributor. Or contact Cincinnati Milling Products Division, Cincinnati 9, Ohio.

°Trade Marks Reg. U.S. Pat. Off.

Technical Outlook

COMPUTER CONTROLS STRIP MILL—Latest mill designs can produce strip within 0.002 in. of target thickness within 3 seconds after the head end is through the mill regardless of schedule varieties, states General Electric Co., Schenectady, N. Y. The firm also predicts that all future tandem, hot strip, finishing mills will be controlled by on-line computers. A single instrument will encompass reheat, rolling, cooling, and coiling.

NEW TESTING TOOL TESTED—When placed in a magnetic field, atomic nucleuses act like tiny magnets. That principle could become an important tool in nondestructive testing systems, states Dr. T. J. Rowland, Union Carbide Metals Co., a division of Union Carbide Corp., New York. By studying the reactions of such nucleuses to varying magnetic conditions, scientists will be able to determine precisely the deviations and imperfections in crystalline structure. It could be adapted to routine testing, claims Dr. Rowland.

CONTINUOUS HOLLOW CASTING—Copper and its alloys are being cast in hollow billets and similar cored shapes with a water cooled mold and mandrel developed by Lobeck Casting Processes Inc., New York. The method is said to produce sound castings with surfaces so smooth no machining is required inside or outside.

BEARING PERFORMANCE UPPED—Superprecise ball bearings made by New Departure Div., Bristol, Conn., General Motors Corp., are being coated with Brite-Guard. Smoother surfaces and corners of treated bearings are said to be less susceptible to dirt and corrosion.

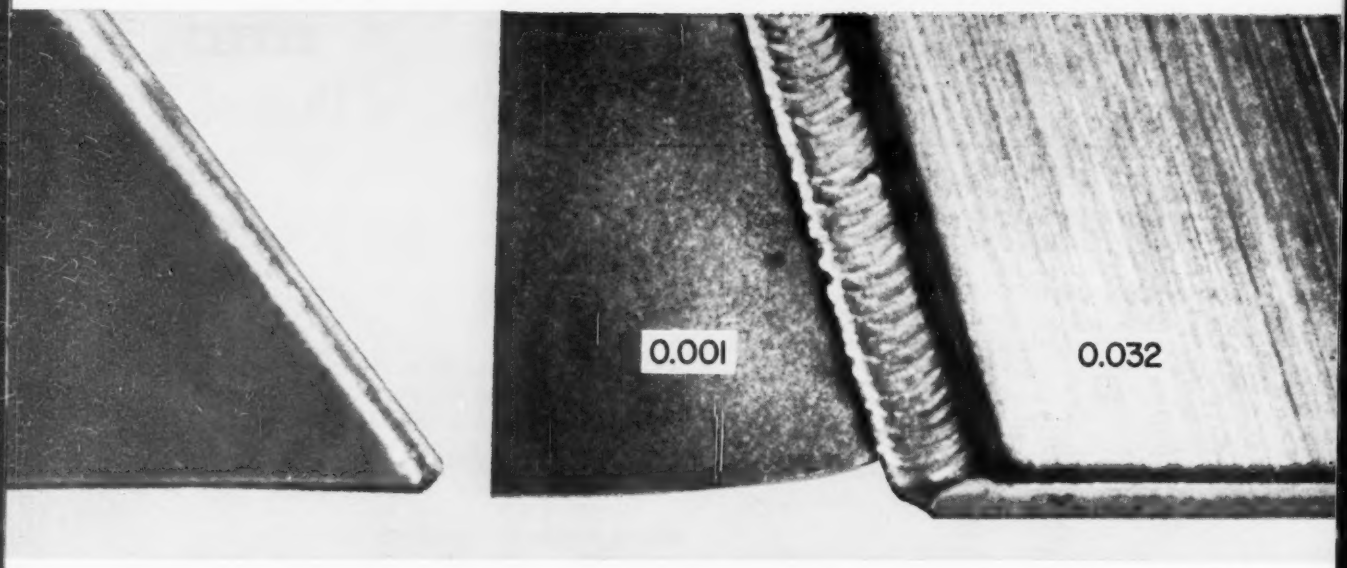
NUCLEAR REACTORS GAIN—Nuclear electrical power is already competitive with conventional power in high cost fuel areas, states Loren K. Olson, atomic energy commissioner. A 300 megawatt reactor could produce power for 6 to 7 mills per kilowatt-hour. Examples given by Mr. Olson: Southern California Edison Co. will construct a 375 megawatt reactor in the near future; Pacific Gas & Electric Co. is designing a 300 megawatt reactor; a New York group will shortly select a reactor in the 300 to 500 megawatt range; the AEC reactor at the Hanford Works, Richland, Wash., will have a 650 megawatt output late in 1964.

FLUID FORMING FAVORED—A flexible punch system for forming sheet metal parts is said to be superior to many standard drawing methods, claims the developer, Svenska Aeroplan Aktiebolaget (SAAB), Sweden. Tools are cheaper, setup time is shorter, and parts are of higher quality, it says. The punch end is a flexible, fluid filled bag surrounded by a heavy die wall. Blank is pushed into a vented female die.

NEW WELD SYSTEM—Successful argon shielded, alternating current, consumable electrode welding is made possible by coating the electrode with rubidium and cesium compounds. The new technique, developed by Air Reduction Sales Co., a division of Air Reduction Co. Inc., New York, welds thin mild and stainless steels with relatively little distortion in unrestrained plates as thin as 0.062 in.

URGENT ULTRASONIC NOTE—Ultrasonic welding is a "must" in spacecraft production, states J. Koziarski, design engineer, Martin Co., Baltimore. He claims either government sponsorship or a co-operative venture is needed immediately to produce final solutions to problems in three areas. No company by itself can afford such a program, he says.

GRAPHITE NOSE CONES—Pyrolitic graphite on a spacecraft's nose and wing leading edges would permit re-entry and maneuvering at hypersonic speeds, states the Missile & Space Vehicle Dept., Philadelphia, General Electric Co. The technique could offer protection in gas temperatures of 13,500° F and surface temperatures of 4500° F.



Source: Northrop Corp.

Edge preparation, low currents, tooling, and control explain . . .

How Planemakers Weld Thin,

• GOOD FUSION arcwelds on thin foils of space alloys that have unusual configurations, are being made on a production basis, say engineers at Northrop Corp., Hawthorne, Calif., and North American Aviation Inc., Los Angeles.

Some examples:

• Stainless foil 0.001 in. thick is buttwelded to sheets 0.032 in. thick.

• Stainless foil 0.0005 in. thick and Rene 41 0.001 in. thick are buttwelded.

• Corrugated webs 0.008 in. thick are through-welded to 0.0015 in. caps on top and bottom.

Materials include titanium, Rene 41, Armco PH 15-7 Mo.

• The secret of success, says Northrop's R. S. Collins, is having a comprehensive knowledge and control of welding variables and their effects on materials. "It is simply finding the right combinations of time and temperature," he says. Here are some tips.

Both Northrop and North American employ conventional welding arcs which attain about 10,000° F. Argon is the common shielding gas although helium is also employed. Speeds of 5 ipm are average on the thinnest metals, says Northrop; on thicker metals, 10 ipm is common.

On all thin metals, the welding rod must be kept absolutely vertical. The gap between the rod and metal is extremely critical in gages less than 0.006 in. and must not exceed the electrode diameter. On 0.001 metal, for example, the gap is 0.010 in.; in any case, it must not exceed the electrode diameter, which is kept as small and as finely sharpened as possible.

Thin materials call for a thin electrode. Reason: You lose energy from the ground point surfaces of large electrodes.

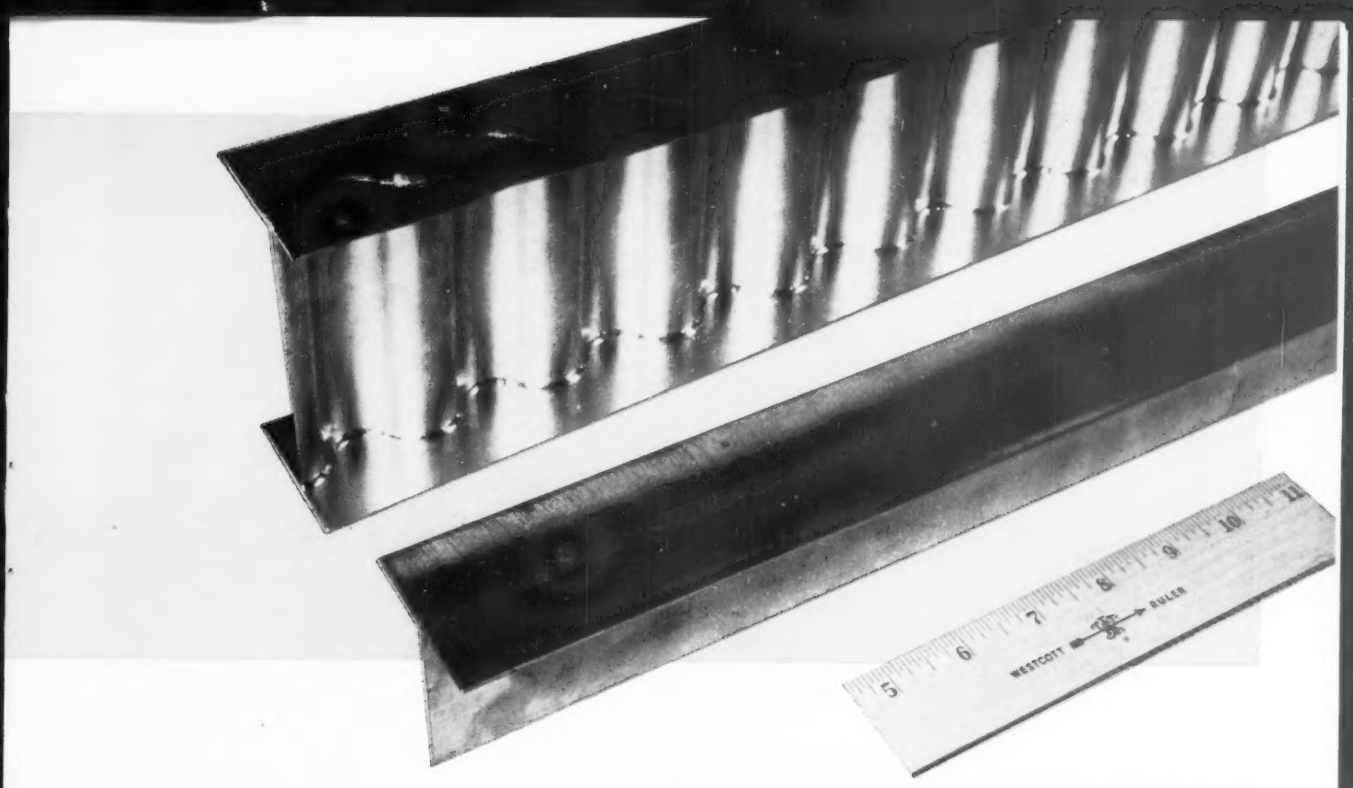
Northrop employs a modified power source which permits starting and stopping arcs at extremely low current densities. For example, the firm can get current densities of less than 1 ampere and still start the arc. Heavier pieces, of course, require more usual current densities. On the piece which joins a foil 0.001 in. to the 0.032 in. material, current density runs from 15 to 20 amperes.

• Since no filler metal is used, stock preparation becomes important. Precision tooling is a must.

Thin foils are prepared by carefully turning the edges to form a tiny flange. The flanges, when melted by the arc, provide enough filler metal. Great precision is required, so vacuum clamping and a special fixture (made by Airline Welding & Engineering Co., Gardena, Calif.) are employed.

In addition to those factors, the distance from the joint itself to the edges of the clamp is critical. "You have to get in close and hold the edges tightly," says Mr. Collins. Vacuum clamping takes any variation in stock thickness while providing even clamping force along the entire length. Successful welds have been made with a gap as little as 0.020 in.

• North American has perfected a weld-through technique for sine wave (corrugated) flanges. Caps are placed on the sine wave flanges, and a cam operated tracer guides a Heliarc torch. Welding is done with filler metal.



Curved Pieces

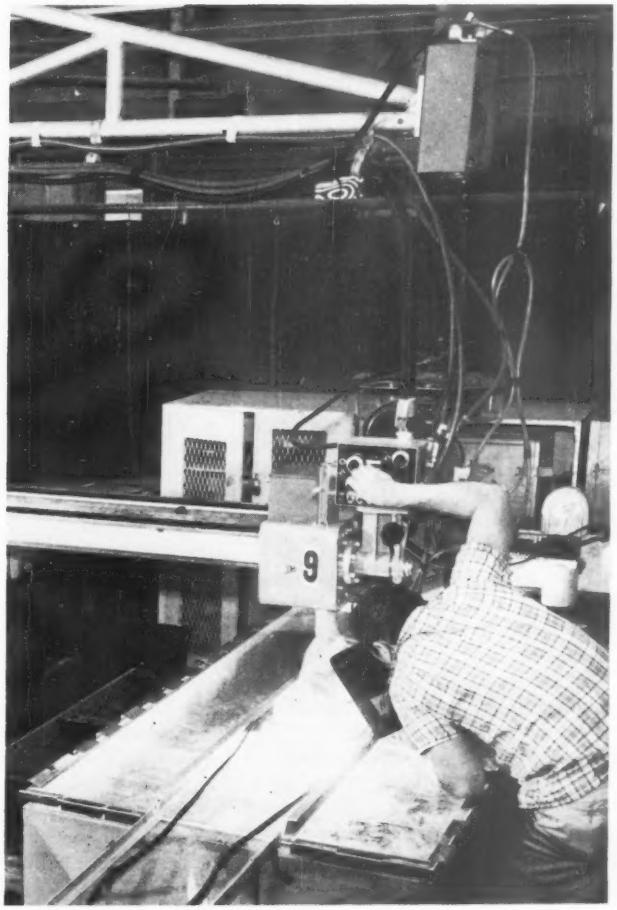
Hand fillet welds won't handle the types of materials which will be employed in the B-70, says H. E. Shay, Welding Dept., North American. The weld-through technique is employed to get x-ray qualities.

The fixturing setup resembles a cam follower, or programed cutting machine except that a Heliarc torch is sometimes used within an atmosphere welding chamber. The sine wave flange is placed vertically in a fixture with the cap on top. The torch traces out the pattern of the sine wave welding right through the cap into the flange to form a T-shaped piece. The process is repeated for the opposite cap.

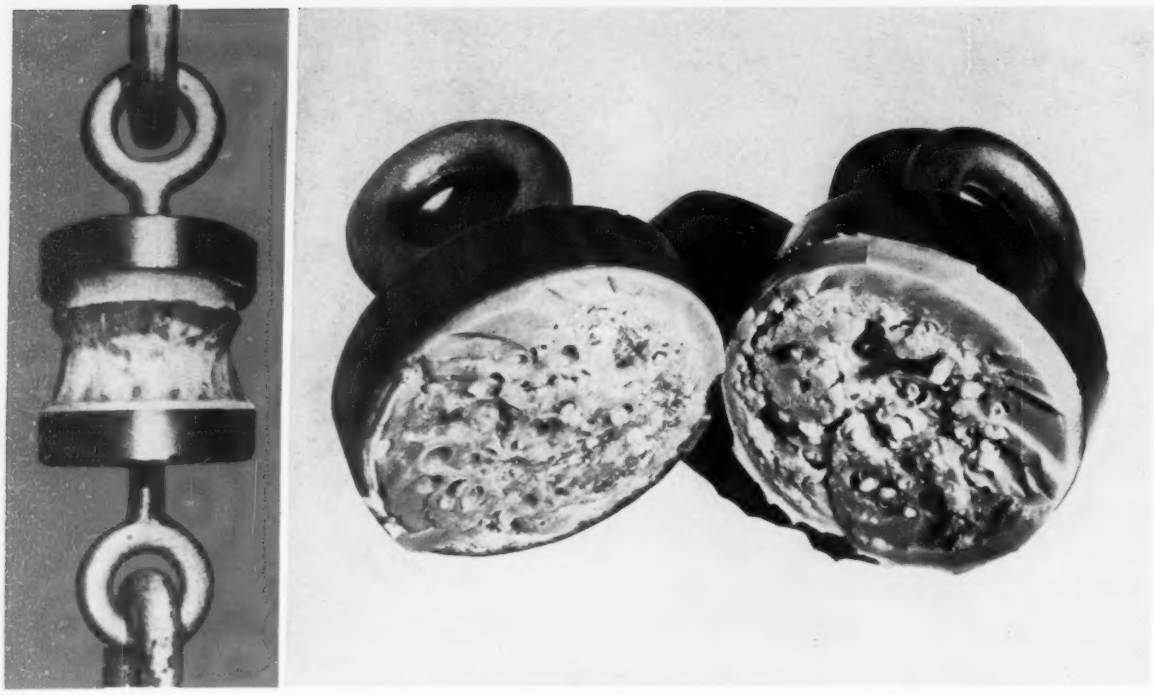
Flanges with patterns other than a straight sine wave can be handled by varying the cam pattern.

STEEL editors observed the welds in both titanium and precipitation hardening stainless. The small fillets produced by the method are extremely regular and have an excellent appearance.

• *An extra copy of this article is available until supply is exhausted. Write Editorial Service, STEEL, Penton Bldg., Cleveland 13, Ohio.*



North American achieves great precision in welding complex curves by employing a tracer-boom similar to those in cutting machines. Head and work are enclosed in argon



Under a stress of 1500 psi, no break occurred at the rubber-metal joint

Rubber to Metal Bonding Needs No Primer, Adhesive

• STEPS in bonding silicone rubber and reinforced gums to ferrous bearing metals can be cut in half with self-bonding compounds, says GE's Silicone Products Dept., Waterford, N. Y. No primers or adhesives are required.

Applications include steel rolls which require a high temperature resistant rubber coating, shock mounts used as vibration dampers in electronic equipment, steel chassis fabrications for electronic assemblies, rubber gaskets and grommets where the rubber must be bonded to conductors, oil seals, and a variety of other products which call for high strength, troublefree bonds.

• Good bonds have been made on garden variety steels, plus chrome, nickel, and stainless grades. Other metals are under test.

Surfaces should be clean and unprimed. The compound is applied to the metal surface under pressure to improve surface contact and to force out trapped air and volatiles which may degrade the rubber structure and bonding capacity. The rubber establishes a bond through a direct reaction with the metal surface.

The rubber can also be used with a primer for nonferrous metals (such as aluminum and aluminum alloys) to establish good bonds.

The company notes that aluminum and aluminum alloys do not give bonds of a quality comparable to those of iron containing alloys.

• The self-bonding grades can be used under high temperature conditions, GE adds.

Some heat resistant silicone rubber grades can take temperatures as high as 600° F, but the most common primers or adhesives are limited to about 300° F.

The company says the bond is generally stronger than the high strength rubber itself (failures usually occur in the rubber).

• The initial grade (SE-5504U) is a high strength compound similar to GE's standard SE-555.

It's a gray compound with this typical physical profile after a cure of 25 hours at 350° F: 1500 psi tensile strength, 200 psi tear, 550 per cent elongation, 50 durometer rating, and a compression set of 45 per cent after 22 hours at 300° F. Pigments can be added to the rubber, although GE says the addition will generally weaken the bonding power.

The material requires room temperature plasticizing on a rubber mill prior to fabrication. GE says best results are obtained if the compound is first put on a tight (1/16 to 1/32 in.) mill until plastic. Only enough compound should be added to cover the roll. After plasticizing a sufficient quantity, the mill can be opened up and the compound put back on the mill for curing agent addition.

Strip Runout Table Has Carbonitrided Steel Rolls

TEMPERATURES of 1100 to 1700° F and water spray quenching are taken in stride by carbonitrided steel rolls used on a hot strip mill runout table at Granite City Steel Co., Granite City, Ill. The rolls were supplied by Badall Co. Inc., Hammond, Ind., a subsidiary of Tool Steel Gear & Pinion Co.

The steel rolls have given trouble-free service, even in the processing of stainless steel, which is rolled without water quenching. Rolls that have been in service five years are said to show only normal wear.

Warping, which could cause bearing failure, hasn't been a problem. Oxide pickup, which could roughen the roll surface and cause surface blemishes or flaws in the steel strip (particularly at the entry end of the table) has been minimized by directing a stream of water on the under side of the first 13 rolls. The water keeps roll temperature at about 150° F and eliminates scaling.

The carbonitrided rolls are said to have high and uniform hardness, a high modulus of elasticity, and extremely good impact resistance. They also exhibit good heat transfer and wear properties, good finish, and low over-all cost.

The wearing surface of the rolls is changed from low carbon steel to material with a higher carbon content in the carbonitriding process. The process is said to impart physical properties comparable to those of tool steels. Careful temperature control and vertical positioning of the rolls during carbonitriding and quenching are said to hold distortion to a minimum.

The rolls are case hardened to 90 or 100 Scleroscope, with a case depth of 3/16 in. Roll neck hardness is held below 50 Scleroscope. That helps the rolls withstand high pressures and heavy loads; it also gives them good abrasion resistance.

The first 80 rolls on the mill table, 10 in. in diameter, are made of thick steel plate; the shell is carbonitrided to maximum depth. An open grid between the rolls allows cooling water to flow freely to the pit. On the other 79 rolls, which are 12 in. in diameter, a solid steel plate tends to retain the water for a longer period.

Machining steel, thickening lotion demonstrate . . .

Tiny Alumina Fibers Have Varied Uses

• FINELY divided fibers of colloidal alumina with unusual properties are being produced in developmental quantities by the Industrial & Biochemicals Dept., E. I. du Pont de Nemours & Co. Inc., Wilmington, Del. The company expects the material, called Baymal, to have metalworking applications in coatings for metals, refractories, and glass, or as an additive for powder metallurgy uses.

The product can be compacted and sintered, or laid down as a coating after dispersion in water. And water dispersions can be converted from fluid to viscous properties by a change in acidity or basicity. Water dispersions are also thixotropic—enough of the powder can be added to produce a solid gel, which will become a liquid when shaken or stirred but reverts to a solid again on standing.

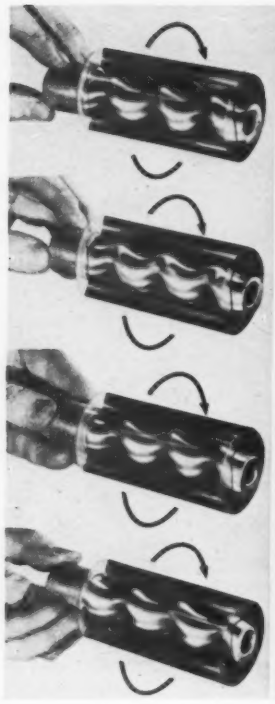
• The material's properties offer new product possibilities.

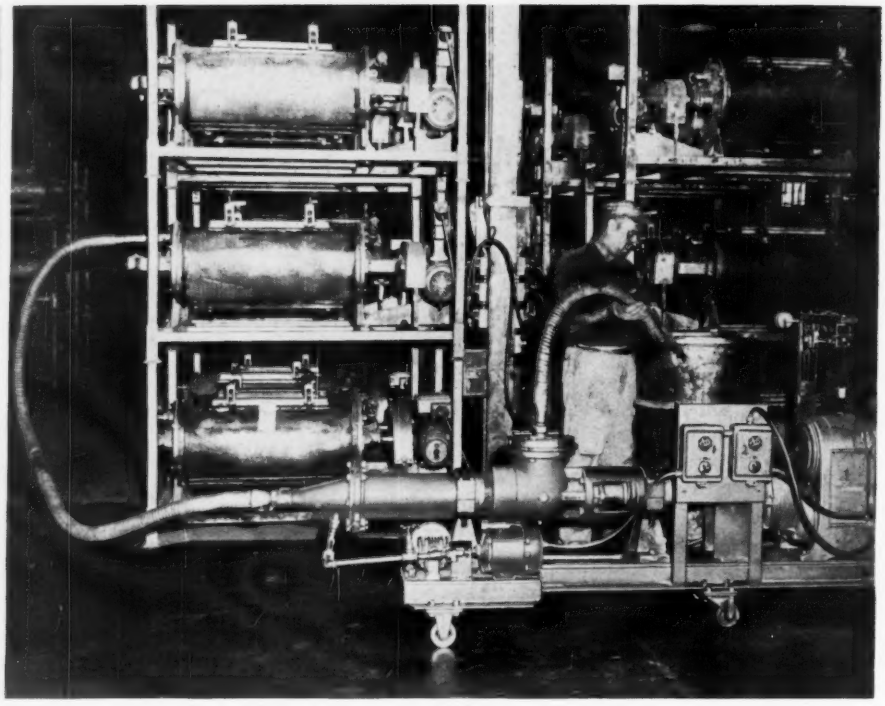
Baymal can be compacted in a press, or mixed with water and extruded. If the pressed powder is sintered at high temperatures, it changes to a corundum type structure, and will cut glass or metal.

The chemical nature of the fibers accounts for many of the properties observed. They are a hydrated aluminum oxide, containing some acetic acid and sulfate ions. They are wettable by water and by organic liquids, so they have some of the properties of surface active agents. Toxicity of the fibers, notes Du Pont's Dr. John Bugosh who discovered the material, is low, so the product may be used for cosmetic applications.

The high melting point characteristic of aluminum oxide suggests that coatings of the powder, deposited from a water suspension, could have applications as a protective layer in refractory construction.

Coatings of the fibrous material can be applied to metal surfaces. They are porous, but offer resistance to abrasion.





Progressive cavity principle cuts dust loss, handling cost as . . .

Pump Moves Metal Powders

• PROBLEMS involved in handling a finely divided powder (300 to 400 mesh) were overcome by U. S. Bronze Powders Inc. when it installed a progressive cavity type pumping system at its Flemington, N. J., plant.

Dust from the powder had a pronounced tendency to escape to the atmosphere, creating a sizable dollar loss (the powder costs about $1 a pound) as well as housekeeping problems.

Moving the dry powder from storage to work station is one of the most thorny and expensive steps in processing.

• The progressive cavity pump permits suction lifting of the powdered bronze, since it behaves like a liquid.

Pump action: A helical rotor turns within a double helical stator, creating cavities between the two elements that move toward the discharge end of the pump. It's similar to a precision screw conveyor and the performance is like that of a piston moving through a cylinder of infinite length—smooth, free from turbulence, with positive displacement and continuous, uniform flow suitable for metering purposes.

At U. S. Bronze, the powder is suction lifted a maximum of 5 ft, passed through the pump, out through 15 ft of 2 in. ID discharge line with varying vertical rise, and finally through a 2 in. hole in the polisher head.

• A small amount of injected air is required to keep the dry powder in a fluid state (by reducing friction between the particles).

The air is supplied by a low capacity compressor and is introduced at the pump's fluidizing chamber and at the discharge port to keep the material flowing into the pump elements and to maintain a 5 psig working pressure in the totally enclosed system.

• A variety of powdered materials can be handled by the pumping system.

Robbins & Myers Inc., Springfield, Ohio, which built the Moyno system used by U. S. Bronze, also reports success in pumping powdered aluminum. R&M says test results also favor such systems for pumping lead, graphite, lampblack, manganese, zinc, and finely ground titanium dioxide and iron.

To date, the maker says progressive cavity pumps have been used on closed systems with runs of 200 ft or more and vertical lifts over 75 ft.

Capacities have ranged as high as 24,000 lb per hour (the manufacturer says that the most favorable performance-cost ratios have been achieved at more moderate deliveries).

Strip Annealing Furnace Uses Convection Cooling

FEATURES OF a furnace ordered by Granite City Steel Co., Granite City, Ill., include a combustion system that can use coke oven or natural gas as its main fuel, complete control of the first cooling section, and a high velocity, recirculated atmosphere final cooling section. Drever Co. will build it.

The furnace, to be used for continuous annealing of tin plate strip, will have a rated capacity of 31 tons an hour when processing material 0.0082 in. thick by 30 in. wide at 1200 ft a minute. It will be capable of handling strip as thin as 0.003 in. and up to 42 in. wide.

The cooling section employs a convection system that drops strip temperature from 900 to 150° F in only ten cooling passes. It replaces the conventional cooling setup—radiant cooling to water jackets, plus a final water quench.

In the convection system, which provides closed, atmospheric recirculation cooling, the atmosphere is blasted onto both sides of the strip over the entire pass length, from plenum chambers with slotted vents. Water cooled heat exchangers at the side suction chambers reduce gas temperature; blowers recirculate the gas for the next cycle.

Strip tension, an extremely critical factor in light gage annealing, will be measured accurately in each section with a load cell setup, made possible by a floating roll bearing mount.

Carbon Bricks Boost Area Of Blast Furnace Hearth

THANKS TO carbon lining, hearth diameter has been increased from 25.5 to 27 ft on the No. 4 blast furnace at Weirton Steel Co., Weirton, W. Va., a division of National Steel Corp. The material makes an effective lining that is thinner than the previous one. It's supplied by National Carbon Co., New York, a division of Union Carbide Corp.

More than 500,000 lb of the bricks were used in the sidewall and bosh linings. Then ceramic bricks were laid over the sidewall lining, to protect it during blow-in.

Close control possible when channel rings of . . .

Titanium Formed 98% Faster with Hot Dies

• A HOT DIE method has cut forming time of a titanium alloy channel ring from 6 hours to 7 minutes, says Grumman Aircraft Engineering Corp., Bethpage, N. Y.

Angularity has been controlled to plus or minus 15 seconds; tolerances average 1/64 in., Grumman claims.

Other advantages include: High quality (drop hammer spoilage of 80 per cent has been eliminated; springback has been corrected); less metal is required (original blank area, 900 sq in., has been cut to 122 sq in.; material saving is $45 a part); handling has been reduced; total saving, including time and material, is $93 per part. Grumman also says its heat control during the forming cycle is an improvement over the former method.

In addition to titanium, the firm says A110-AT has been formed. Prospects look good for newer alloys as well.

• The titanium parts are employed in the engine exhaust system of Grumman's W2F-1 radar scout plane. Nearly half the 400 parts employed in plane construction are formed by the hot die method.

The rings illustrated are 8 per cent manganese, titanium alloy 0.25 in. thick. The die is AISI H-13 hot work tool steel heat treated to Rockwell C-49, then drawn to 1100° F.

The die is mounted on a hydraulic cushion in a modified Williams-White hydraulic press. High temperature of the die is maintained by an electrically heated platen. The hydraulic cushion is kept near room temperature by circulating water through an insulating plate. Graphite lubricates both dies and parts.

Parts were formerly made on drop hammer dies, then stress relieved in fixtures. The new method bypasses that step and in most cases eliminates the need for afterform trim tools, states Grumman. Parts are Zyglo checked for cracks.

Radiation Control Program Paces Technology Gains

• PROTECTION of personnel from harmful radiation is getting increased attention in companies that use radioactive materials in equipment for inspection and measurement. Example: A full-time engineer is employed to handle the radiation control program in all operations of Bethlehem Steel Co., Bethlehem, Pa.

X-ray machines, radium, and radioisotopes have been employed by the company in an ever widening range of applications—including material inspection, liquid density determination, measurement of bin and tank content, and rolling mill control. That led to adoption of a program for around-the-clock protection of personnel working near radioactive materials.

• Radiation hazards are evaluated by the radiation control engineer, who directs the over-all protection program.

Safe use of radioactive materials is the responsibility of the department concerned. Supervisory personnel responsible for handling radiation sources must be sure that employees under their control have proper safety training.

The supervisor sees that each man wears an appropriate monitoring device. The supervisor knows the location of radioactive material in his department and strictly enforces established regulations. He confers with the radiation officer about hazards in his area and sees that outside contractors use radiation equipment under approved conditions. He sees that each worker involved undergoes required medical examinations and blood tests.

One of the early requirements for control of radium and x-ray sources: All x-ray and radium surveys were to be made by specialists who weren't employees of Bethlehem Steel. But the rapid increase in the number of gaging devices used by the company (49 are in use at the Sparrows Point, Md., plant) made it impractical for outside personnel to do that survey.

• Personnel who may be exposed to appreciable amounts of industrial radiation are enrolled in the company's film badge program.

An occupational history of each individual is filed in the Industrial Health Engineering Dept. Radiation exposures—measured by the employee's film badge—are recorded.

The badge is a small, rectangular plastic container that holds appropriate radiation sensitive film. The film is clouded by the incidence of radiation when the badge is worn throughout the exposure period.

The company maintains its own film processing laboratory, which provides internal control of developing techniques. After development, films are evaluated and filed permanently.

The laboratory is responsible for instrument calibration and for registration and licensing of the company's radioisotopes and other ionizing radiation sources. (Those practices are required by law.)

Radiation control activities include a leak testing program for sealed sources, such as radium and isotopes. Appropriate records are filed permanently. The Atomic Energy Commission requires a leak test on sealed isotopes at least once every six months; Bethlehem does such tests three times a year. Field surveys are conducted periodically on all radiation sources, and new or modified installations are given special attention.

Plant Personnel Must Be Protected against Radiation from:

- X-rays or gamma rays from metal radiography equipment.
- X-rays or beta rays from metal thickness gages.
- Gamma rays from liquid density indicators.
- Gamma rays from liquid or solid level indicators.
- Alpha rays from electrostatic eliminators.
- Radiation from tracer elements.
- Radiation from x-ray, electron diffraction, or electron microscope equipment.
- Radiation from electron tubes that operate above 15 kilovolts, or those that contain radioisotopes.

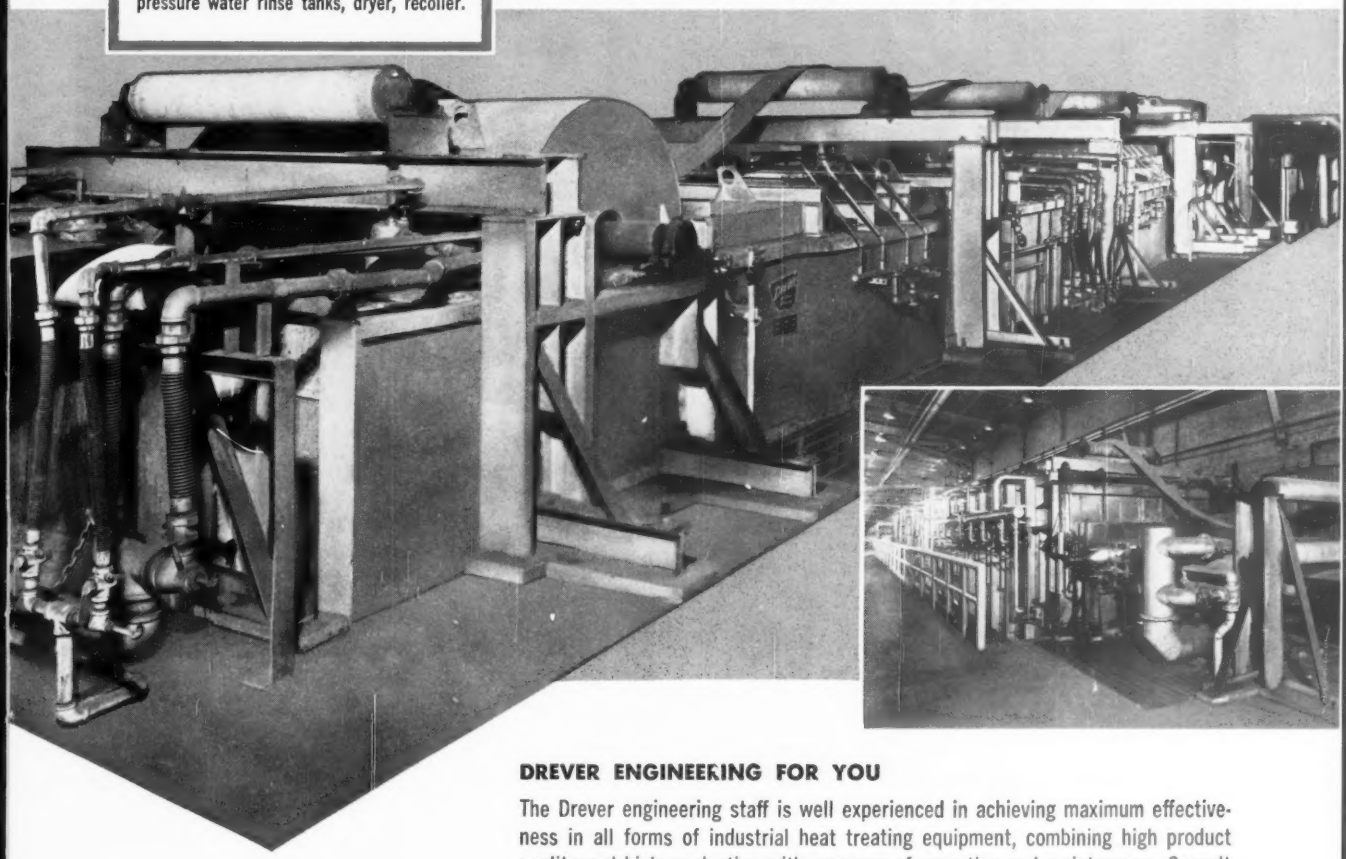
PUTTING A FINE FINISH ON STAINLESS STRIP –

DREVER CONTINUOUS DESCALING SALT BATH

Users of stainless strip are demanding high finishes that reduce their own production problems. To achieve this standard of finish on the heavier gauges of series 300 strip, a Drever Continuous Descaling Salt Bath provides high quality, fast descaling. The strip is immersed in a molten salt bath at controlled temperatures up to 950°F, no atmosphere is required, and speeds up to 150 FPM are attained. Gauges from .018″ to .095″ in widths up to 52″ are handled from coils weighing as much as 10 tons.

Drever designs and builds batch and continuous salt baths for stainless strip, plate, bar, wire or tubing. Or, complete lines providing for continuous annealing and descaling can be engineered to the producers requirements.

This Drever Continuous Descaling Salt Bath receives cold rolled strip at bath temperature from the annealing furnace shown in the smaller picture. Descaling unit consists of salt bath, water quench, acid dip, high pressure water rinse tanks, dryer, recoiler.



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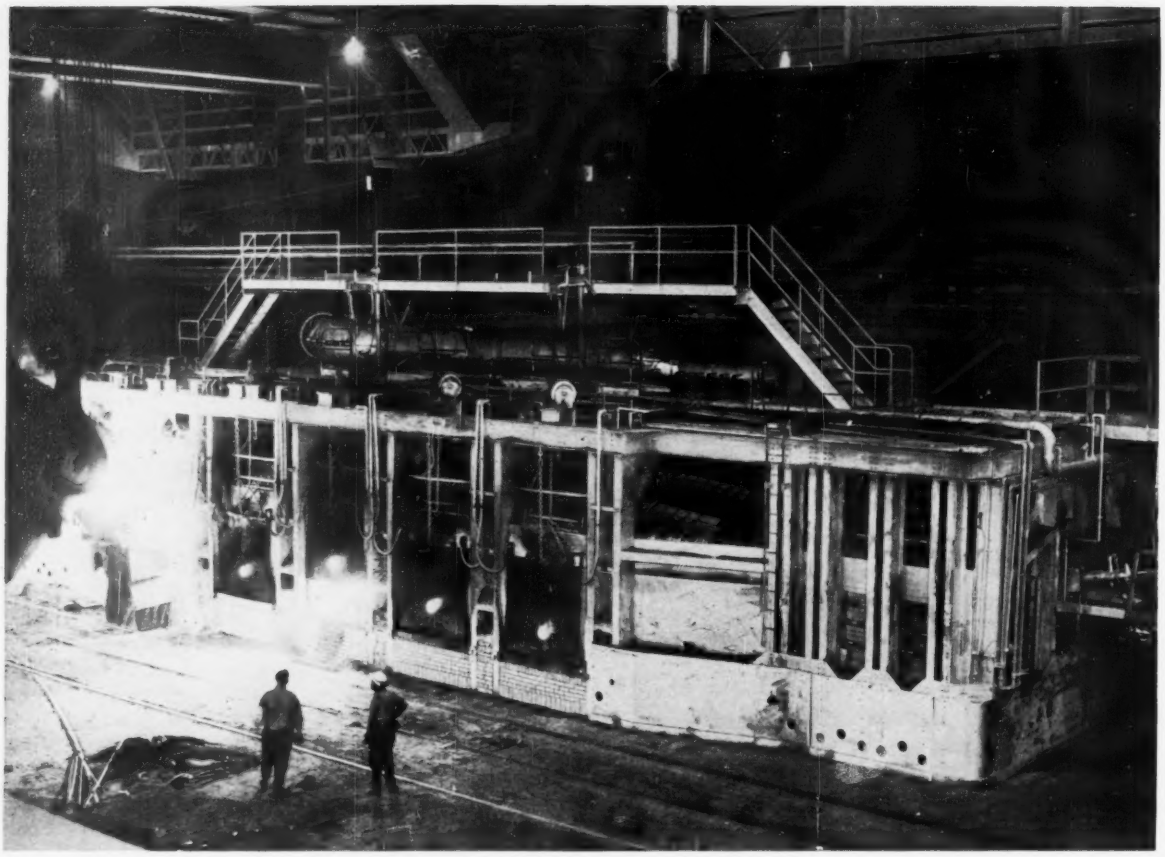


Lancing can increase open hearth output 40 per cent . . .

Oxygen Practice Gets Boost At Old, New Steel Plants

• STEELMAKERS continue to aim for higher production and lower operating costs by increased use of metallurgical oxygen. Generating capacity is keeping pace.

Examples: An on-site plant is ready to supply oxygen for a new, basic oxygen steelmaking shop at the Pueblo (Colo.) plant of Colorado Fuel & Iron Corp. Another facility, already on stream, is furnishing gas for roof lances in a renovated open hearth shop at the Portsmouth (Ohio) plant of Detroit Steel Corp.

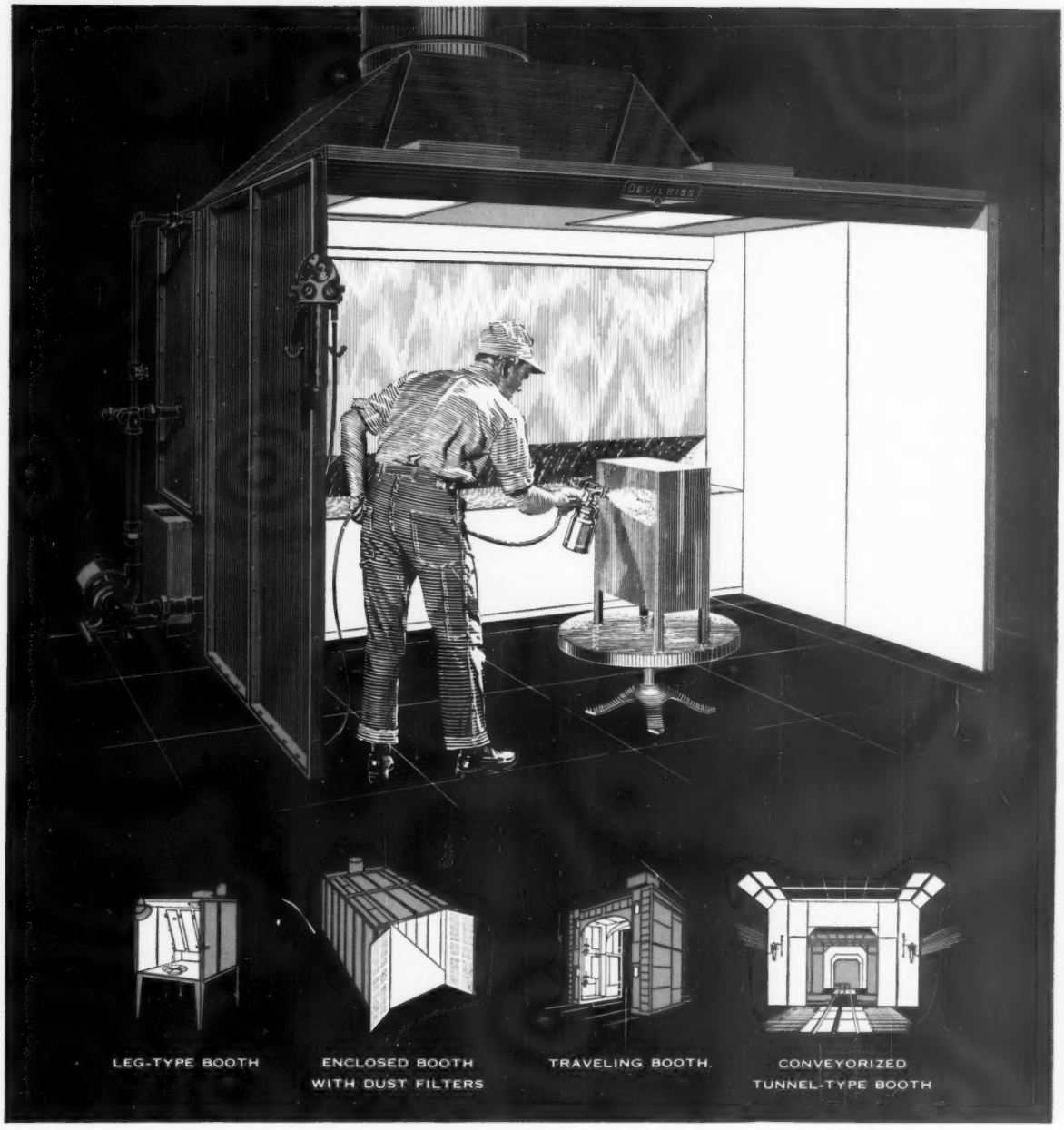
The Pueblo plant will turn out 280 tons of oxygen a day. The Portsmouth facility has a daily output of 140 tons. Both plants were built by Linde Co., a division of Union Carbide Corp., New York, and will be operated by Linde.

• Most of the output from the Pueblo plant will go to CF&I's new, basic oxygen steelmaking shop. But some of the gas will be used in open hearths and blast furnaces.

The steel capacity expansion, made at a cost of $21 million, is typical of the industry swing to faster, higher capacity techniques. The two big furnaces will be able to produce more than 100,000 tons of ingots annually.

The company's interest in the oxygen method stems from an investigation of lancing techniques for open hearth operations in the early 1950s. The company has done extensive work with Linde on the use of oxygen in the blast furnace. Tests in which natural gas is used in the blast have been conducted at Pueblo for nearly a year; a commercial scale test of oxygen and natural gas in the blast was started earlier this month.

Besides reducing the over-all cost



spray booths from DeVilbiss have high paint-trapping efficiency . . . easy to install, operate, clean. They're part of DeVilbiss' complete line of matched equipment for coating and finishing that includes: airless, conventional, hot-spray outfits; automatic spray, dip and flow coaters; air compressors, air and fluid hose, ovens, spray washers, air-replacement units, complete "turn-key" finishing systems.

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of blast furnace operation, enrichment of the blast with oxygen and natural gas will increase the hot metal capacity. That's important in the basic oxygen process because the new steelmaking furnaces require a higher hot metal to cold scrap ratio than the open hearths. Normal charge for a basic oxygen steelmaking unit: 80 per cent hot metal and 20 per cent scrap. Hot metal open hearths usually charge equal amounts of scrap and hot metal.

• Additional oxygen at the Portsmouth plant makes it possible to lance all furnaces at once and boosts annual ingot capacity to 1.4 million tons.

The production increase was obtained from a relatively small investment in jets and auxiliary equipment. Extensive capital investment would have been required to obtain the same capacity increase through new furnace construction.

In 1959, the company began a five year expansion program. The first step: Conversion of all open hearth furnaces to oxygen lancing. The practice is expected to increase the company's melting capacity 40 per cent (about the same as adding two new open hearths).

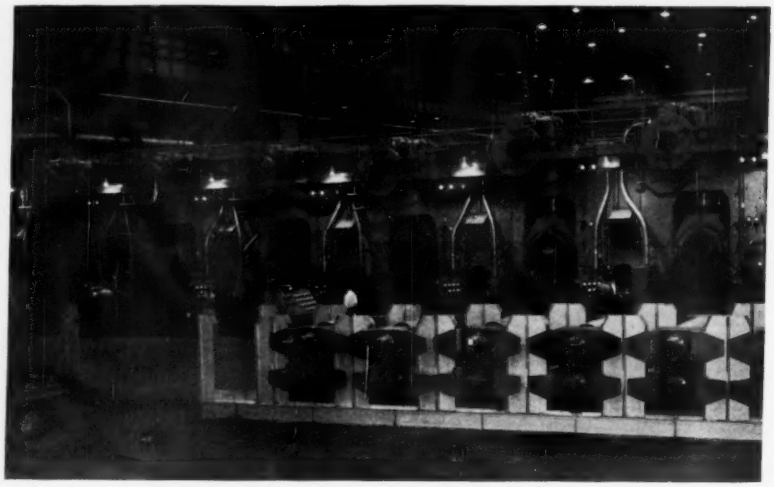
Two jets and a basic roof were installed on one furnace during a scheduled rebuild in late 1959. Mill personnel were trained in the principles and techniques of roof jet operation, and test heats were made in December of that year.

Tests showed production gains of better than 25 per cent, so the company went ahead with plans for a full scale roof jet program at Portsmouth. Jets are now on all five of the mill's open hearths. The production rate has been brought up to an average of 30 tons per hour per furnace. One of the open hearths has produced 60 tons per hour on an experimental basis.

• Gas and liquid storage facilities are slated for expansion.

Analysis of the Portsmouth mill's over-all requirements and oxygen use pattern showed a need for more storage capacity to accommodate demand variations. Result: Liquid storage facilities will be doubled to hold the equivalent of 3 million cu ft of gaseous oxygen. And gaseous oxygen storage capacity will be boosted to 190,000 cu ft. That will make it possible for consumption of oxygen at the mill to fluctuate over a wide range, while the generating plant produces at its most economical rate.

Prior to installation of a flame scarfing machine in 1958, the company's oxygen was delivered in cylinders or by frequent liquid trailer deliveries. But the scarfing machine's oxygen requirements and the anticipation of experimental use of oxygen for metallurgical purposes made it clear that on-site generating and storage facilities were needed. After extensive engineering studies and evaluation of future needs, Linde built a 20 million-cu-ft-per-month plant, which went on stream in 1958.



More mill rolls make for greater reduction . . .

Strip for Thin Tin Plate Rolled on Six Stand Mill

• PAPER THIN tin plate strip is being rolled on a six stand, cold reduction mill at Indiana Harbor Works, East Chicago, Ind., of Youngstown Sheet & Tube Co.

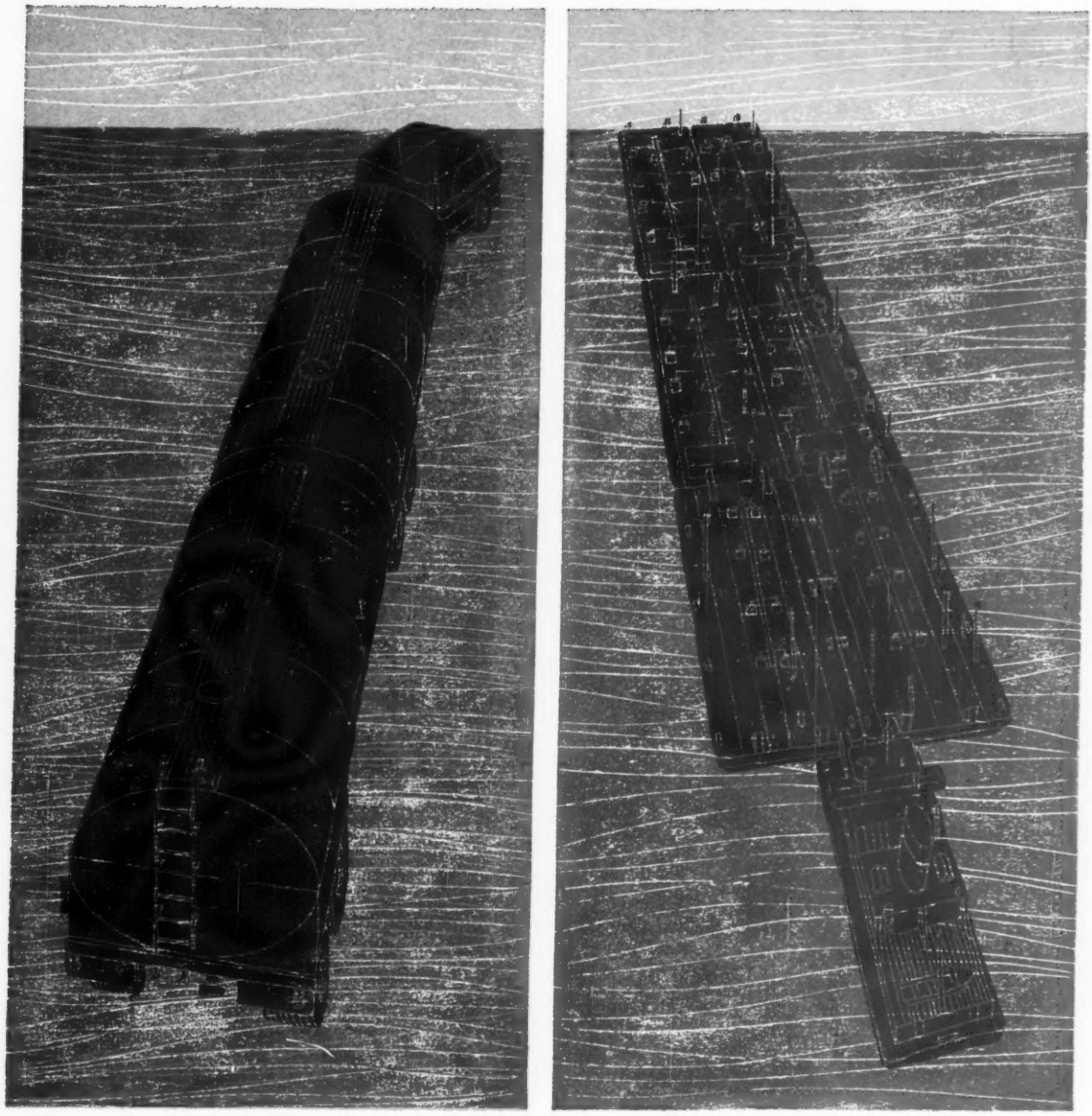
The mill, supplied by Mesta Machine Co., Pittsburgh, is equipped with data logging equipment to record a complete history of each coil as it is rolled.

• Uniform gage is maintained in high speed rolling.

Addition of a sixth mill stand makes it possible to roll thinner strip at higher speeds than on conventional mills. (Usually, cold reduction mills have to do the same amount of rolling on four or five stands.) Maximum rated speed of the mill is 7250 ft a minute—about 82 miles an hour. The mill can be started in 14 seconds and stopped in 7.

The mill handles strip 22 to 46 in. wide, in coils 30 to 80 in. in diameter. Maximum coil weight: 62,100 lb. Reduced to its thinnest gage, such a coiled strip would be more than 30 miles long.

The six stand unit is part of a major expansion program at the plant. Other items: A continuous annealing line that went into operation recently and a galvanizing line slated for production soon.



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Tips on Selecting, Making Epoxy Tools

Most desirable factors: 1. Least desirable: 4. In-between: 2 and 3.

	Laminate	Metal Core Surface Cast	Mass Cast	Paste
Dimensional Stability	1	3	4	2
Shrinkage (during cure)	1	3	4	2
Least Weight	1	4	3	2
Labor Cost	4	3	1	2
Material Cost (per pound)	4	3	1	2
Strength	1	2	3	4
Toughness	1	2	4	3

• SOME of the toughest tools a sheet metal shop can find are made of plastics, claims Ren Plastics Inc., Lansing, Mich.

Such tools fall into four categories: Laminated, surface cast, mass cast, and paste materials. Here is some basic information about structures, techniques, advantages, and disadvantages which will assist you in selecting and using plastics for tools.

• In deciding which method will be most beneficial for a specific job, seven principal factors should be considered: Dimensional stability, shrinkage, weight, labor cost, material cost, strength, and toughness.

The chart (above) rates approximately the several desirability factors. It is only an approximate guide, says Ren. Specific situations can alter the ratings slightly.

Plastic casts or laminates can be taken from wood, plaster, plastic or metal surfaces, provided they are properly prepared.

Wood models, finished with a lacquer sealer, should be prepared this way: 1. Clean surface thoroughly (acetone, alcohol, or a commercial solvent). 2. Apply a high grade carnauba paste wax and rub thoroughly with a lintfree cloth. 3. Brush or spray a parting agent. 4. When dry, apply paste wax and wipe off (do not rub).

Plaster models are sealed with lacquer and prepared the same way. So are plastic molds or models. Metal models need only be cleaned and coated three times with carnauba wax rubbed between coats.

Rough metals should be cleaned and coated with wax. One brush coat or three light spray coats of wax are adequate for parting. A final coat of paste wax completes the preparation.

Laminated Tools

To prepare a model, a coat of plastic is applied. When tackfree, a glass paste is applied to fill sharp corners and details which could cause voids or bubbles under the initial layer of glass cloth. (The glass paste mixture can be made of a laminating plastic mixed with chopped fibers and flocking.)

Apply alternate layers of laminating resin and glass cloth until the desired thickness has been completed. Don't apply more than 18 layers ($\frac{3}{8}$ in.) at once, says Ren, because the heat generated by curing can cause excessive warping.

Framework, when used, should be added immediately after laminating. Wait 6 hours before removing the laminate.

Surface Cast Tools

Three methods are good for surface castings: Pour—a core is suspended over the die model (usually elevated at one end) and sealed around the edges. Plastic is poured through spouts at the open end. *Squash*—liquid or paste is put on the die model. A core placed on the material is allowed to settle. *Pressure Pot*—a core is suspended over the die model and sealed around the edges. Liquid is forced into the bottom and allowed to vent at high points.

Mass Cast Tools

When a mold is ready, plastic material is poured, and allowed to cure, then removed. If an unusually large mass is being poured (more than 1 in. thick), fillers such as sand and gravel, glass balls, volcanic ash, pumice, cork, or ground nut shells prevent heat accumulation (exotherm) and greatly reduces shrinkage. Greatest disadvantage is its low strength.

Paste Plastic Tools

Nonflowing paste plastic can be applied to vertical surfaces, does not have to be cast to a level surface as liquid plastic does, and doesn't have to be held with special equipment.

A principal use is for spline masters, particularly aircraft types. They are not difficult nor complicated to construct, says Ren.

Summary

Laminated tools are accurate, strong, and light. They are dimensionally stable and are widely employed as gages, checking and inspection fixtures. It is hard to surpass a laminated drilling fixture, claims Ren, when you consider accuracy, cost, and building time.

Surface cast tools are widely employed for sheet forming dies. They have been widely accepted for patterns and coreboxes.

Mass castings of plastics are usually employed for large tool surfaces such as aircraft stretch blocks or hammer forms. The material has good physical properties, is relatively inexpensive, and can be cast in sections up to 24 in. thick.

Tennessee Coal & Iron · Weirton, Steubenville · Irvin Works
Youngstown Sheet & Tube, Indiana Harbor · Columbia–Geneva
Weirton, Weirton · Steel Company of Canada · Fairless Works
Jones & Laughlin, Aliquippa · Granite City · Inland Steel
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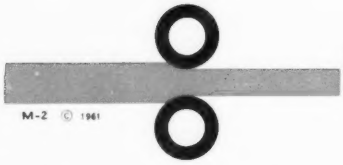

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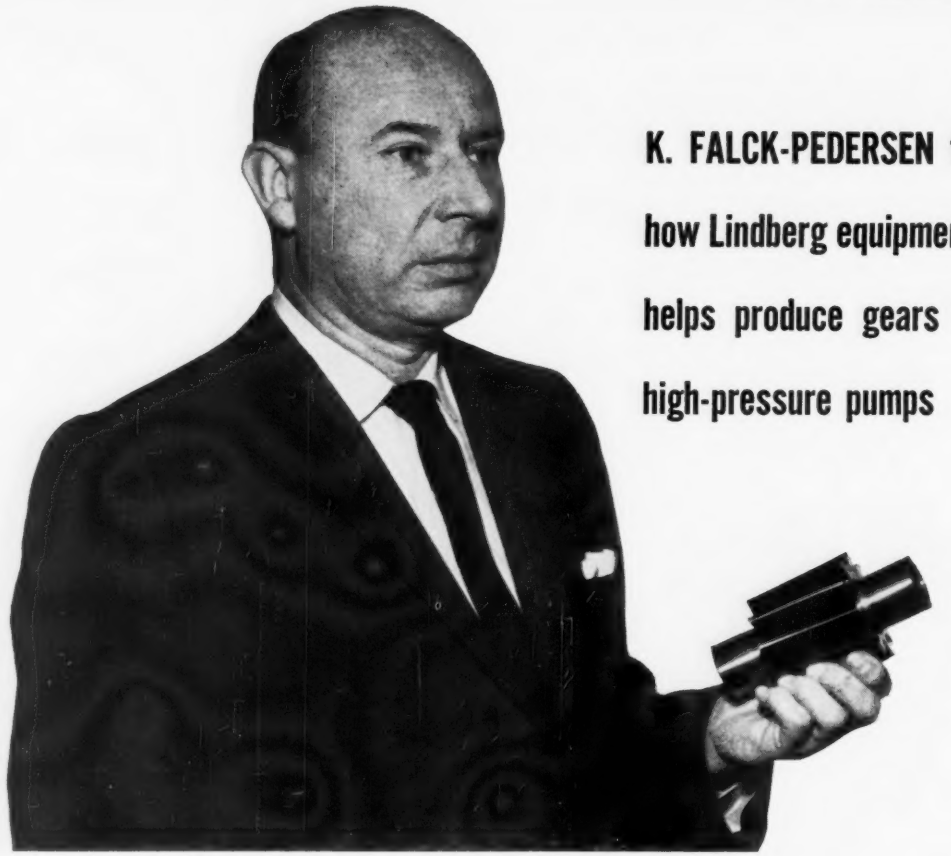
ROLLING MILLS · MORGOIL BEARINGS · WIRE DRAWING MACHINES · COMBUSTION CONTROLS

K. FALCK-PEDERSEN tells how Lindberg equipment helps produce gears for high-pressure pumps



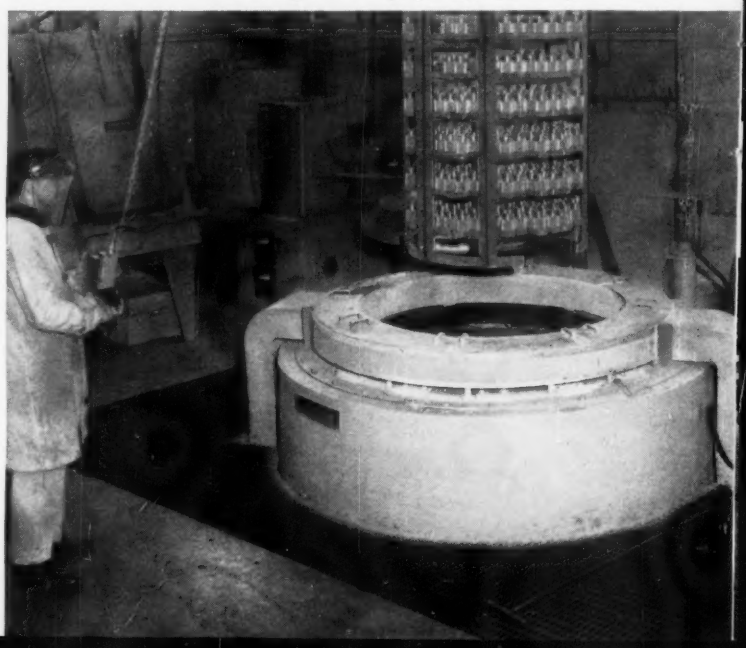
QUOTE

Mr. K. Falck-Pedersen, Chief Engineer, Commercial Shearing and Stamping Company, Youngstown, Ohio.

COMMERCIAL *shearing & stamping*

"The Lindberg heat-treating furnaces and atmosphere generating equipment installed in our Youngstown plant two and one-half years ago provided a fine solution to a big problem of ours. The units now give us complete and precise control over hardening and treating of gears for our high-pressure pumps. During these years, the equipment has proven trouble-free, required little maintenance and has proved to be remarkably easy to operate."

Gears being loaded in Lindberg Furnace at Commercial Shearing and Stamping Company, Youngstown, Ohio.



Lindberg equipment at Commercial is used for carburizing gears for high-pressure pumps and allows mass production of practically distortion-free gears, while holding the degree of hardness as well as depth of case to very close tolerances—load after load after load. The installation includes one electric and two gas-fired furnaces, Lindberg Hyen Atmosphere Generator and Carbotrol.

If you have a problem in heat treating, why not get the Lindberg representative's help now? You can depend on his experience and Lindberg's engineering and design know-how to provide exactly the right equipment for your need. And it's easy, too! Just call your Lindberg Field Engineer (he's listed in your classified phone book) or write us direct. Lindberg Engineering Company, 2441 West Hubbard Street, Chicago 12, Illinois.

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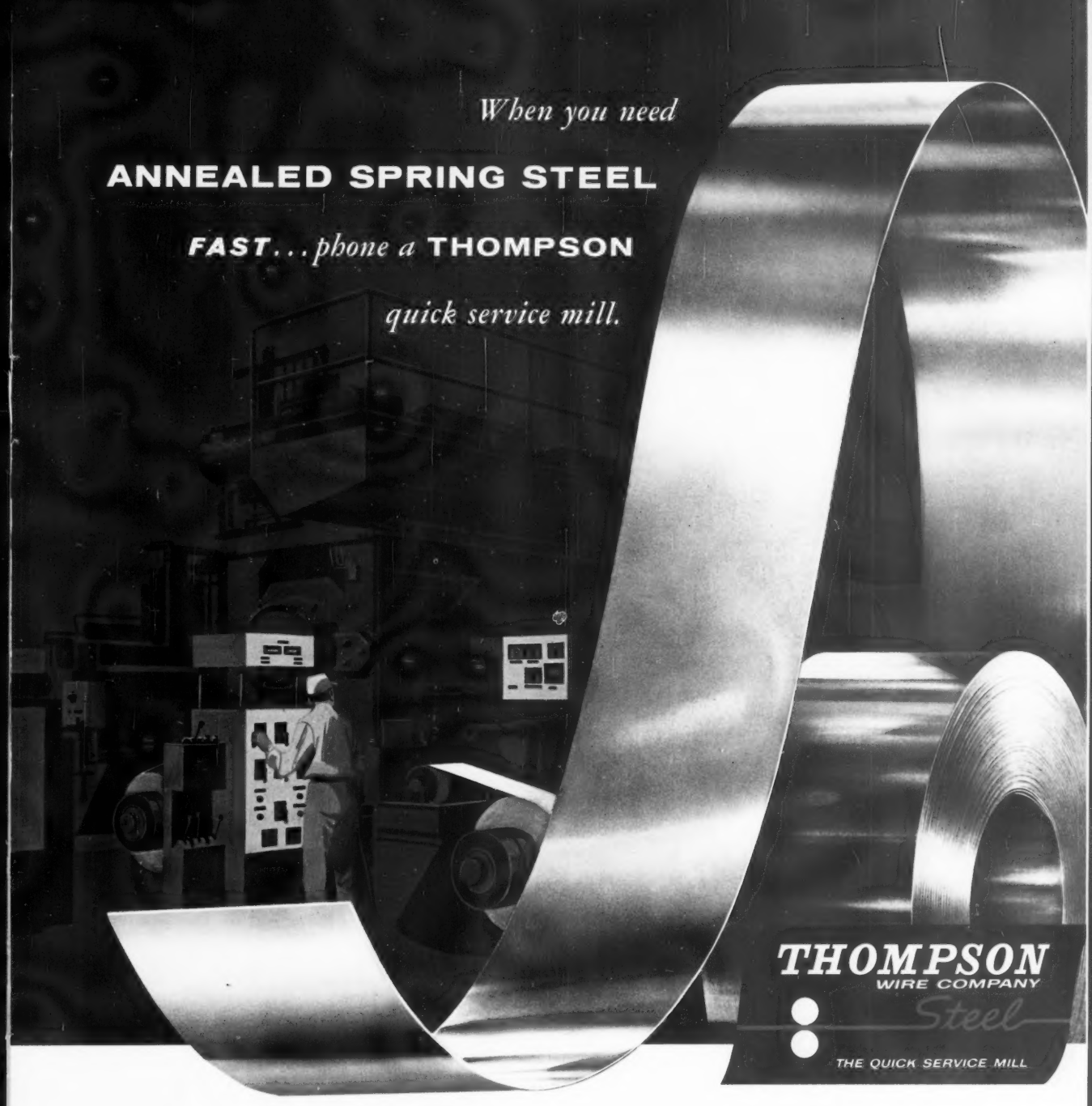

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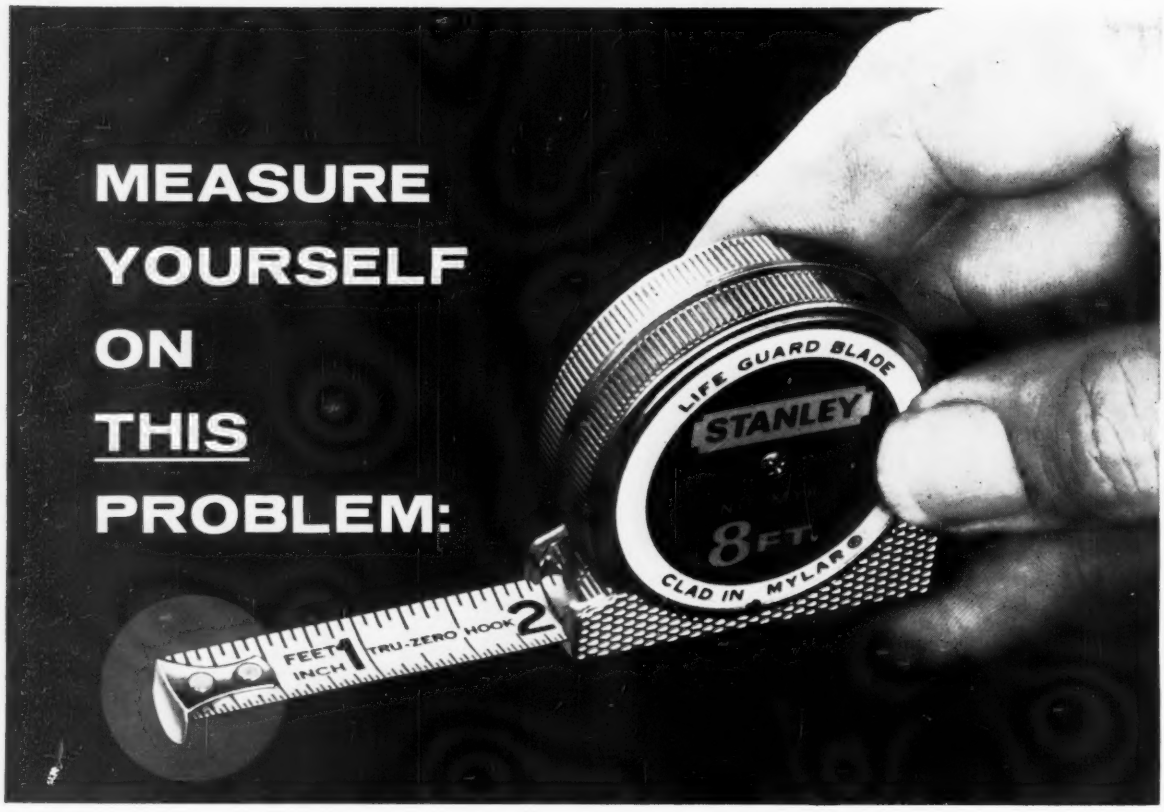

"Make it slide exactly 0.025 inch . . . hold it securely . . . do it at lowest cost"

Stanley got the answer from a TRS man

The hook on the end of a steel tape rule must slide back and forth, exactly enough to offset the thickness of the hook when taking outside or inside measurements. The problem faced by Stanley Tools of New Britain was to put the sliding action in the hook, without making profits slide.

How to avoid the high cost of attaching the hook with screw machine fasteners was the question put to a TRS Engineer, trained in the PAR Process approach to assembly work. His answer saved 31% on fasteners and 8% on per-unit assembly time.

He demonstrated that the precision of standard TRS nickel-plated steel shoulder rivets would fully satisfy the needs of the job. Also, that the two rivets could be automatically fed and set in one operation by a standard TRS double-drive riveter.

Foreign rivets flopped on this job. Stanley was quick to pass the new cost-cutting trick on to their English plant. They shipped a duplicate TRS riveter over and tried foreign-made rivets, but without success. Now, TRS rivets are used in the English operation. TRS has the equipment, skill and quality control to assure reliable precision.

How Precision Slide is Achieved –

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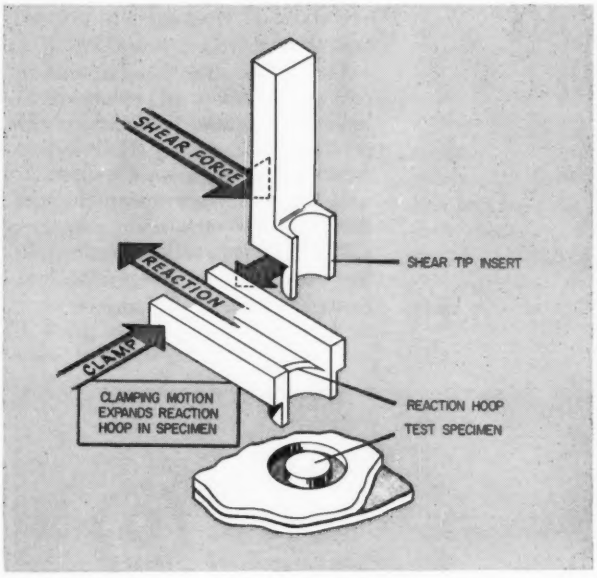
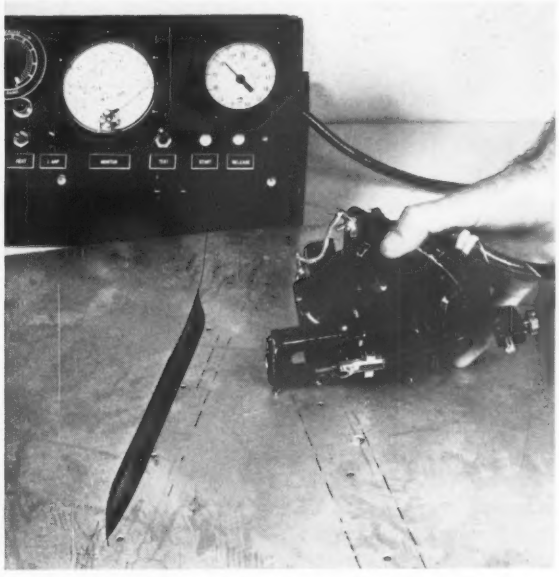
If it's a Tubular Rivet TRS makes it . . . and Better

Shear Tester Checks Adhesive Joints





Instrumentation accurately measures and controls heat input and pressure exerted by shear tip and reaction hoop. Device (right) has an air operated diaphragm which provides the shear force

• A PORTABLE shear testing device enables Convair Div., Ft. Worth, Tex., General Dynamics Corp., to save up to several thousand dollars in testing adhesive bonded panels on each B-58 it makes.

Called Portashear, the instrument is the key part of a technique which checks the quality of such panels at both room temperature and 260° F.

Since the B-58 employs 3300 sq ft of bonded honeycomb and 1200 sq ft of bonded beaded panels in 327 assemblies, the technique has major significance as a production tool, says Charles F. Herndon, senior design engineer at Convair.

• A Portashear has three parts: A shear head, a pneumatic rate controller, and a heater with temperature regulator. Accessories include a controlled depth cutter (air powered), master load gage calibration unit, and a locating template.

The operation begins by placing the locating template; cutting a doughnut shaped hole through the skin layer (inner cutter diameter is ¼ in., outer is ⅜ in.); then placing the Portashear unit in position to engage the skin button made by the cutter. A half moon shaped tip and a shear lever force the button in shear and measure the force needed for failure. Button holes are directly over fastener holes. In the few occasions when tests must be located elsewhere, the resulting holes can be filled in and smoothed off.

A resistance heater and a thermocouple are built within the shear tip insert of the Portashear. Springs hold the heater and thermocouple against the button surface during hot tests.

All equipment and accessories are portable, says Convair, and can be fitted into a kit that weighs less than 40 lb.

• Some differences noted between Portashear and lap shear testing have been worked out satisfactorily by Convair engineers.

Nearly all B-58 bonded structures are either aluminum faced sandwiches or of inner skin design. Thicknesses range from 0.015 to 0.5 in. Nitrile rubber phenolic or epoxy phenolic adhesives are employed. Practically all shapes are curved.

Convair inspects such assemblies three ways: In the test lab, destructively, and ultrasonically (stub tests). Test tabs are always included with each production assembly. The Portashear concept was developed to supplement those tests and permit easier checking of adhesive quality on finished parts.

Before Portashear results could be accepted, engineers reviewed and resolved these:

1. The small Portashear specimen area suggested that excessive emphasis might be given to minor or local adhesion imperfections. (A visual check has proved adequate to pinpoint such cases and permit retesting.)

2. A single lap shear test specimen has inherently higher peeling tendencies; Portashear readings, being more nearly a true shear, are usually higher. (Correlation charts are being used.)

3. The lap shear specimen i s usually oven heated. Portashear specimens are contact heated. (No problems have been noted with a modulating temperature controller.)

Extrusion Press Increases Seamless Tubing Output

• PRODUCTION of seamless steel tubing has been doubled at Gulf States Tube Corp., Rosenberg, Tex., a subsidiary of Michigan Seamless Tube Co. Reason: A new, $5 million mill that's said to be faster and more efficient than conventional facilities.

Key to the mill's high production rate: An 1800 ton vertical extrusion press that converts 24 by 4 in. billets into steel hollows 9½ to 42 ft long, with outside diameters of 2¼ to 3¾ in., in about 20 seconds. The press extrudes 150 of the billets per hour, producing 80 to 260 ft of hollow stock per minute.

Carbon or alloy steels (including stainless grades) can be processed on the press.

• The new mill is fully automated; steel is handled mechanically from the time bars are placed on conveyors at one end of the building until tubing comes out the other.

Incoming bars are cut into square, 24 in. billets with high speed torch cutters. Billets are weighed on an automatic, recording scale and taken to the press area. There, they are fed into a large, rotary hearth furnace and heated to forging temperature. A hydraulic press forges them into rounds for processing in the extrusion press.

Mechanical fingers place the rounded billet into the vertical die. Then the piercing mandrel and press head move downward, driven through heavy, herringbone gears by a powerful electric motor. About 20 seconds later, the semifinished tube comes out of the discharge opening 35 ft below.

• Semifinished tubing is rolled or cold drawn to size.

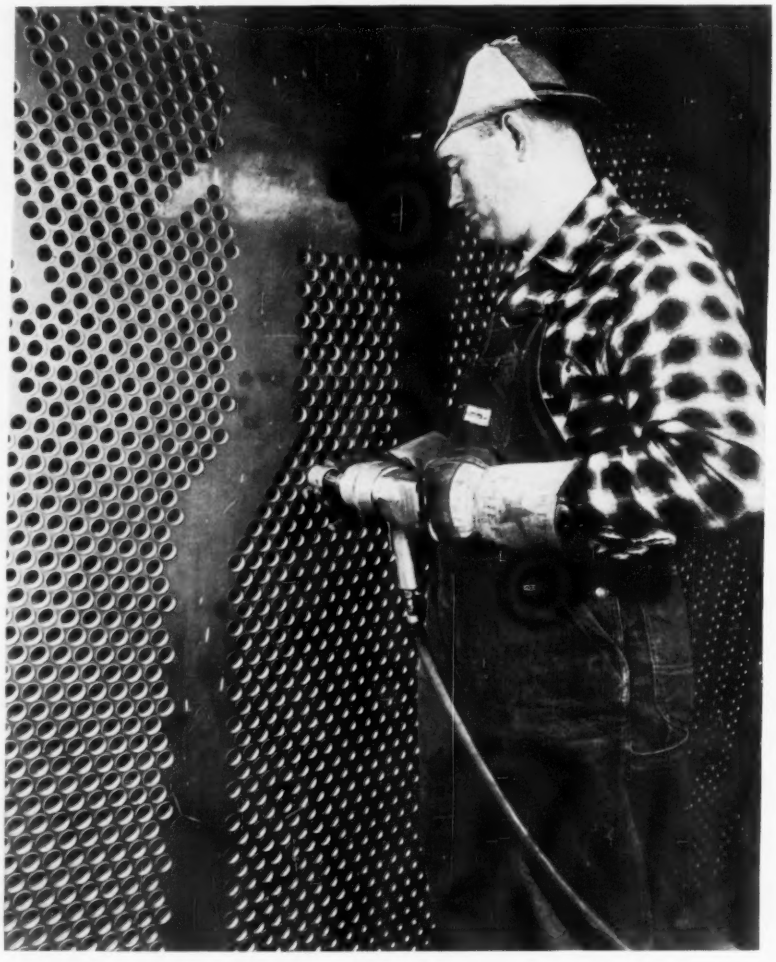
Hollow sections are straightened and rolled to size in a reducing mill. Wall thickness is gaged, and the tubing is x-ray inspected. Then the finished sections are cut to length automatically and hydrostatically tested to specifications.

Electronic equipment monitors the movement of steel throughout the mill. Instrument readouts and controls are on the operator's console in front of the extrusion press. The electronic system stops the entire mill and indicates the exact location of the malfunction for the operator.

The operator is in telephone contact with men stationed at critical points. He can immediately direct operations to clear up any production delay.

The new mill complements a cold draw facility. It processes steel hollows like those produced on the new extrusion press. Hollows are reduced in diameter and wall thickness when they are drawn through dies and over mandrels.

Principal applications of the tubing: Oil wells, cracking stills, condensers, and heat exchangers.



Roller Tool Seals Condenser Tubing

TUBE ENDS are sealed with a rolling device in the air cooling section of a steam condenser, at the Charles P. Crane Station, Baltimore, of Baltimore Gas & Electric Co. Corrosion resistant tubing was made of Type 316 stainless, produced by Allegheny Ludlum Steel Corp., Pittsburgh.

'Bored Disc Stronger Than Solid' — GE

A BORED disc of proved quality is more reliable than a solid disc, believe G. R. Heckman and A. W. Herbenar, Gas Turbine Dept., General Electric Co., Schenectady, N. Y.

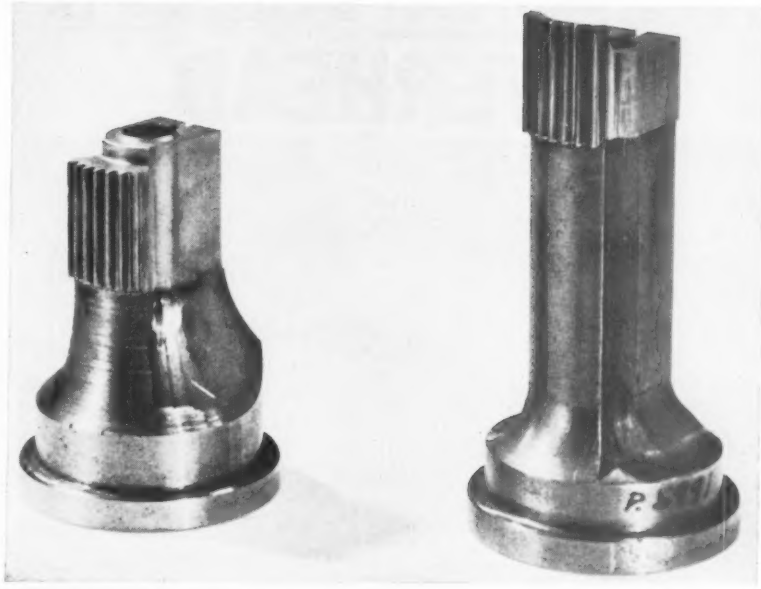
They told participants at a meeting of the American Society of Mechanical Engineers that GE employs bored discs (of a modified 12 per cent chromium) for these reasons:

- To provide as much surface as possible for effective heat treatment of metal next to the bore.
- To remove the center material which is most susceptible to segregation (and weakening).
- To permit closer examination and inspection of the bore area.
- To bring about a greater reduction in hydrogen content and residual stress level during stress relieving.
- To permit a greater and more effective plastic straining near the bore during hot spinning to produce a favorable zone of residual compressive stresses.

• **Cite Reasons**—Designers have always argued about the merits of boring high speed rotating parts, say the GE engineers. A bore introduces a local increase in tangential stress and strain at the bore which is almost twice the value seen in a solid wheel. But with normally good material, considerable evidence indicates that the bursting speed of a bored disc may exceed that of a solid disc. That conclusion is based on a large number of burst and stress strain measurements conducted over a number of months.

Why? It's the action of plastic strain in relieving stress concentrations and bringing a favorable redistribution of stress, say Messrs. Heckman and Herbenar. It can be accomplished with comparatively small plastic strains and relatively low ductility.

The engineers point out that GE is producing bored gas turbine wheels successfully from alloys which are prone to segregation—the adverse effects are being removed or negated successfully.



Punch design for metal powder parts is tricky, yet . . .

Lower Alloy Tool Steel Gives Better Service

• **IN CHOOSING a tool steel, you can't assume that a higher alloy is necessarily better for a job than a lower alloy content material. Kwikset Powdered Metal Products, Anaheim, Calif., found that a lower alloy, special purpose steel gave better service in punches for its presses.**

The company makes powdered metal parts such as gear sections, ratchet arms, and parts with internal splines; in many cases, the variation in thickness from section to section cause poor die life.

Use of the metal powder lowers part cost—provided the saving is not eaten up by the expense of tool replacement.

Standard material for the punches used in the widely varying parts was a D-2 (high carbon-high chrome) type steel. It has good wear resistance, and shows little distortion on hardening. But service life was low; tools tended to break frequently.

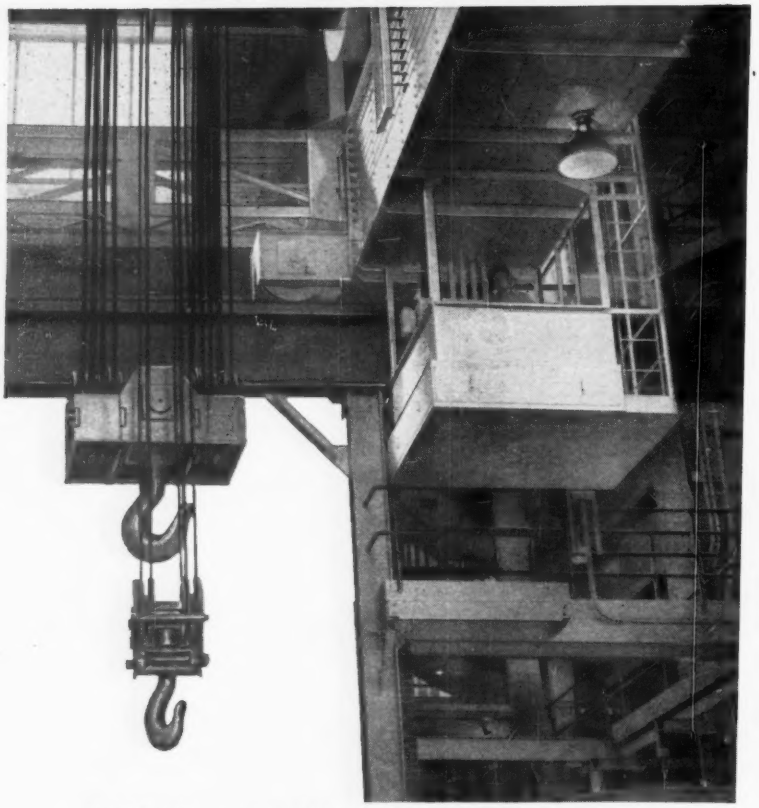
Considerable increase in tool life was observed when a change was made to R.D.S. (an AISI Type L6 which is a product of Carpenter Steel Co., Reading, Pa.).

• **Kwikset reports that breakage is no longer a problem; tool life exceeds 50,000 pieces per grind.**

Punch problems in powder metallurgy service are severe. Sections may be thin, yet pressures are high. Tools cannot be permitted to buckle or bend. And the metal powders used are abrasive, further increasing the possibility of tool wear.

The R.D.S. steel is oil hardening. It is about 75 per cent as machinable as a plain water hardening tool steel, and has good nondeforming properties. The combination of toughness and the ability to oil harden, so that cracking in punches of varying section is no problem, helps explain the good service observed in making powder metal parts.

The Shortest Distance Is OVERHEAD



With Shepard Niles JOB-MATED Cranes

Traveling cranes deliver the goods **directly,** from point to point within your plant or warehouse, or even from one building to another.

They move masses of material faster, more efficiently–speed up production–because they travel **over** obstacles, not **around** them. And they leave passageways, work areas, and grounds free of moving equipment, with greater safety for your employees and materials.

Best of all, traveling cranes allow you to increase your useable storage capacity by eliminating aisles, and enabling you to store material up to the beams.

Shepard Niles JOB-MATED Cranes with auxiliary hoists are not merely handling devices, but versatile, highly engineered machine tools that contribute directly to increased production and profits. You'll find them ideally suited for your production and storage requirements. Write for complete details on how Shepard Niles JOB-MATED Cranes will improve your profit picture.

Member of Electric Overhead Crane Institute
America's Most Complete Line of Cranes and Hoists

SHEPARD NILES
CRANE AND HOIST CORPORATION

1162 Schuyler Ave., Montour Falls, N.Y.

Finds Easier Way To Inspect Seals

• A SIMPLE light box is solving major problems in the dimensioning and inspection of flexible oil seals.

Developed by International Packings Corp., Bristol, N. H., the device is said to offer these advantages:

• Inside diameters may be measured and sorted in increments of 0.002 in.

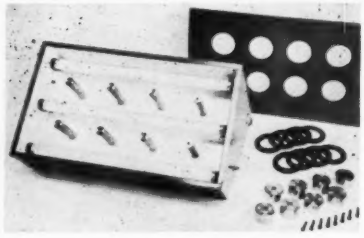
• Slight defects such as nicks and cuts at critical contact points can be easily spotted.

• One inspector can visually inspect and sort 2000 pieces an hour.

• One light box is adequate for several sizes.

• The light box is inexpensive to construct.

• **Controls**—Four factors control inside diameter: 1. Each batch of milled compound must be consistent with every other batch. 2. Each cavity of the molding tool must be held to a close tolerance. 3. Trimming, a major source of variation, must be backed by ample facilities for gaging. 4. When springs are used for lip support, spring tension must be checked before seal assembly.



Light shining from beneath eases inspection job when oil seals are fitted over plug gages. (Exploded view shows construction.)

Light boxes are normally made with fluorescent sources to keep heat at a minimum. Plug gages are placed in the center (as illustrated); the system can be employed as a simple go, no-go with two plugs, or several may be used to provide incremental sorting.

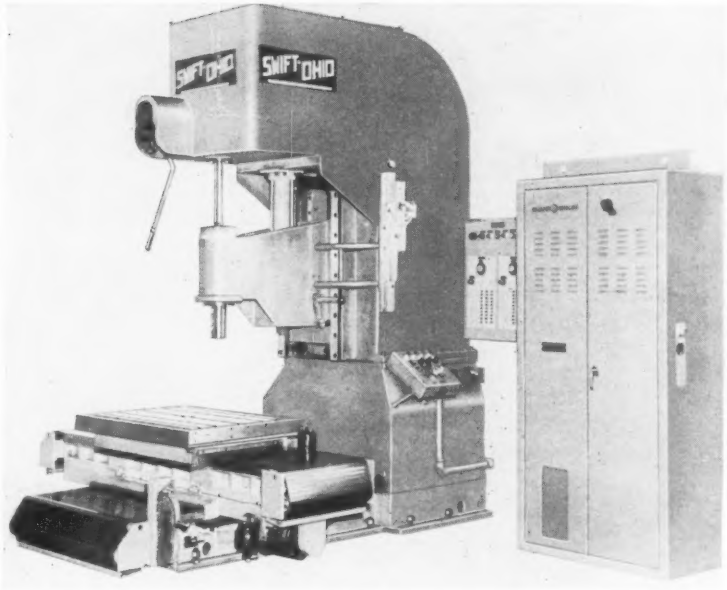
Up to 14 stations at 0.002 in. increments are adequate to establish statistical distribution curves, says International Packings Corp.

Drilling Units Cut Down on Setup Requirements

DRILLING, boring, tapping, and positioning can be automatically or manually controlled on the No. 425 upright, heavy duty drill. The unit eliminates extensive setup, jigs, fixtures, and large inventory storage on limited production items. It has a numerically controlled, 24 x 36 in., compound table; hydraulic feed to spindle; 18 spindle speeds (52 to 2250 rpm); and fine and coarse feed range provided by quick change gears.

Also announced is the No. 415-H drilling unit which has the positioning Blox method with pushbutton selective control, rotary index sequencing, and vertical or horizontal programing. Complete setup time from one size part to another is less than 10 minutes.

For further information, *write* Swift Ohio Corp., Kenton, Ohio.



Unit Does Horizontal, Vertical, Angular Milling

THE SPINDLE head on the H-V Toolmaster, turret type, milling machine is designed for horizontal milling with arbor mounted cutters and for vertical and angular milling with the spindle head swiveled and the arbor support removed.

To save setup time, the unit may be equipped with any one of three different vertical heads on the opposite end of the overarm. Quick change from horizontal to vertical or angular milling is accomplished by loosening four bolts and swiveling the overarm and turret base as a unit to locate the vertical head over the table.

The Toolmaster line consists of five styles (1B, 1C, 1D, 1E, and H-V), differing primarily in the type of milling head and drive.

The table feed screw comes with an antibacklash device. The pendant mounted control includes start, stop, and reversing switches. The unit is powered by a 2 hp horizontal motor through a horizontal gear drive.

No. 40 standard spindle nose is supplied. Standard spindle speeds: 75, 105, 160, 230, 360, 515, 750, and 1130 rpm. Optional: 50, 70, 110, 150, 245, 350, 535, and 750 rpm. Reverse is provided.

Table size is 10 x 42 in. Three 11/16 in. T-slots are provided with 2-5/16 in. between slots. An extra-wide knee bearing on the column face increases rigidity, and greatly improves resistance to deflection.

Micrometer dials are extralarge for knee, saddle, and table handwheels. Graduations are large and clearly legible. Oil shot lubrication for parts within the knee, saddle, and table is provided. Table stop dogs help provide micrometer accuracy in length of cut. The extra-long saddle is an aid in assuring surface plate flatness of table traverse.

The unit has a longitudinal table traverse of 22 in. Maximum range from the center line of the horizontal spindle to the top of the table is 18¼ in.; minimum is 1¼ in.

Maximum range from the horizontal spindle nose to the face of the column is 20⅜ in.; minimum is ⅜ in.

The H-V comes with complete electrical equipment for 50 or 60 cycles, 2 or 3 phase, 220 to 550 volts ac. It's wired in accordance with Machine Tool Electrical Standards.

(*Please turn to Page* 140)

You seldom need this sign

Youngstown safety limit stops protect against overhoisting accidents, provide positive check against human errors.

Write for Bulletins on any or all EC&M controls. They give complete descriptions of equipment and explain why EC&M control keeps cranes operating at top efficiency. Square D Company, EC&M Division, 4500 Lee Road, Cleveland 28, Ohio.

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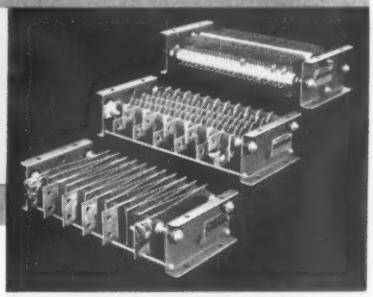
EC&M DIVISION • CLEVELAND 28, OHIO

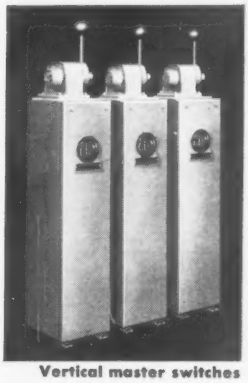
when your cranes are equipped

with EC&M CONTROL

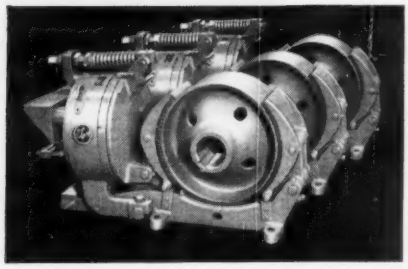


Tab-Weld resistors eliminate burning at the grid eyes or tap plates. Available in capacities from 13 to 500 amperes continuous.

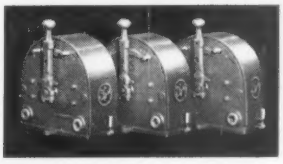
DC controllers are simple to maintain, provide pinpoint accuracy and safe operation.



Vertical master switches require little mounting space. Short throw reduces operator fatigue.

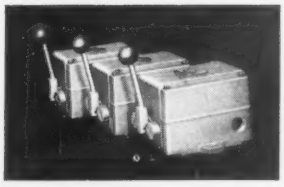


Long-life brakes give high-speed performance, have 100% lubrication so that dirt can be flushed out.



CM master switches have short throw of operating handle and narrow width for close grouping.

Manual-magnetic disconnect switches provide a convenient and quick means of "killing" the crane, including an emergency remote-controlled STOP button.

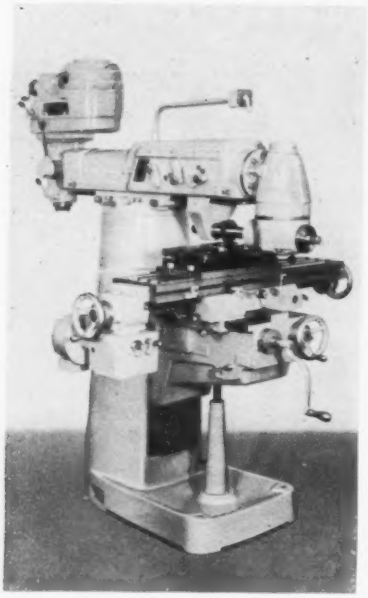


MA master switches provide a maximum of 3 speed points. Can be grouped with other masters or can be used on auxiliary drives.

WHEREVER ELECTRICITY IS DISTRIBUTED AND CONTROLLED . . . . .

3880

(*Concluded from Page 137*)



Floor space requirements: 78½ x 83-13/16 in. Net weight: 2500 lb.

For further information, *write* Milling Machine Div., Cincinnati Milling Machine Co., Cincinnati 9, Ohio.

Furnace Designed for Hydrogen Atmospheres

CRITICAL heat treating processes, such as reducing tungsten oxide powder to pure metal, are applications for the Pereco electric hydrogen furnace. The straight line unit (Model SNX-10248) has three zones: Insulated preheat, central high temperature, and water cooled exit. The exit and entrance ends are equipped with a counterbalanced, sliding plate door and a solenoid operated flame curtain.

To permit the placement or removal of parts without undue loss of protective atmosphere, the hot zone is separated from the entrance and exit areas by interior blast gates, manually operated from the outside. Depending upon the maximum operating temperatures, the unit may be equipped with an alloy muffle (1900° F), or with a ceramic muffle (2600° F).

In the hot zone, silicon carbide heating elements are divided into three separate banks. Each bank is controlled by its own voltage regulating transformer with "fine" and "coarse" tap switches (36 taps), and with a direct reading power input ammeter. The unit uses 7½ in. of graded, superduty, lightweight refractories. The water cooled zone includes a water inlet and outlet connection, and is equipped with an automatic water temperature controller. Power requirements: 35kw, 440 volts, 60 cycles, 3 phase.

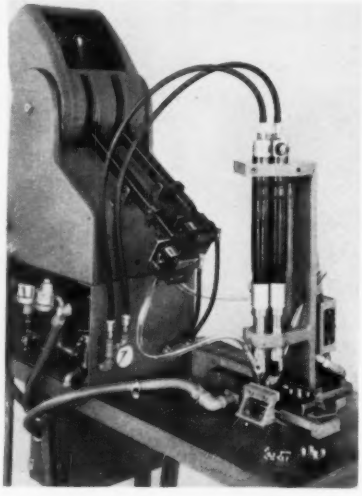
For further information, *write* Pereny Equipment Co. Inc., 893 Chambers Rd., Columbus 12, Ohio.

Screw Driving Machine Has Automatic Cycle

THE OPERATOR of a dual spindle, Tru-Tork, automatic, screw driving machine doesn't have to punch or flip any electrical switches or handle screws or the tool. The machine has an automatic cycle. Both hands are free for loading.

The unit has two, air fed, screw drivers with Tru-Tork nose pieces and a double track, oscillating hopper with two metering devices. In operation, a shuttle type fixture is used to push the part into position where it is held firmly by a nylon pressure pad. When the part is centered under the driving head, a limit switch is contacted which initiates the drivers. Screws are simultaneously metered and driven while the next part is positioned.

Completed parts automatically unload into the chute. The unit uses normal shop air pressure to operate driving heads and air at 40 psi to operate the metering device which feeds screws.



For further information, *write* Clyde Engineering & Mfg. Co., 937 E. Ten Mile Rd., Madison Heights, Mich.

Transmission Rating: 550 to 600 ft-lb of Torque

A FOUR speed auxiliary transmission (Model 7041) with a nominal torque rating of 550 to 600 ft-lb has been developed by Dana. Quieter operation and easier shifting in all gear positions is assured by constant mesh helical gears. It weighs 340 lb and is 25 3/16 in. long. A Spicer top mount, power takeoff is available.

For further information, *write* Dana Corp., Toledo 1, Ohio.

Long Range Indicator Gages Tough Locations

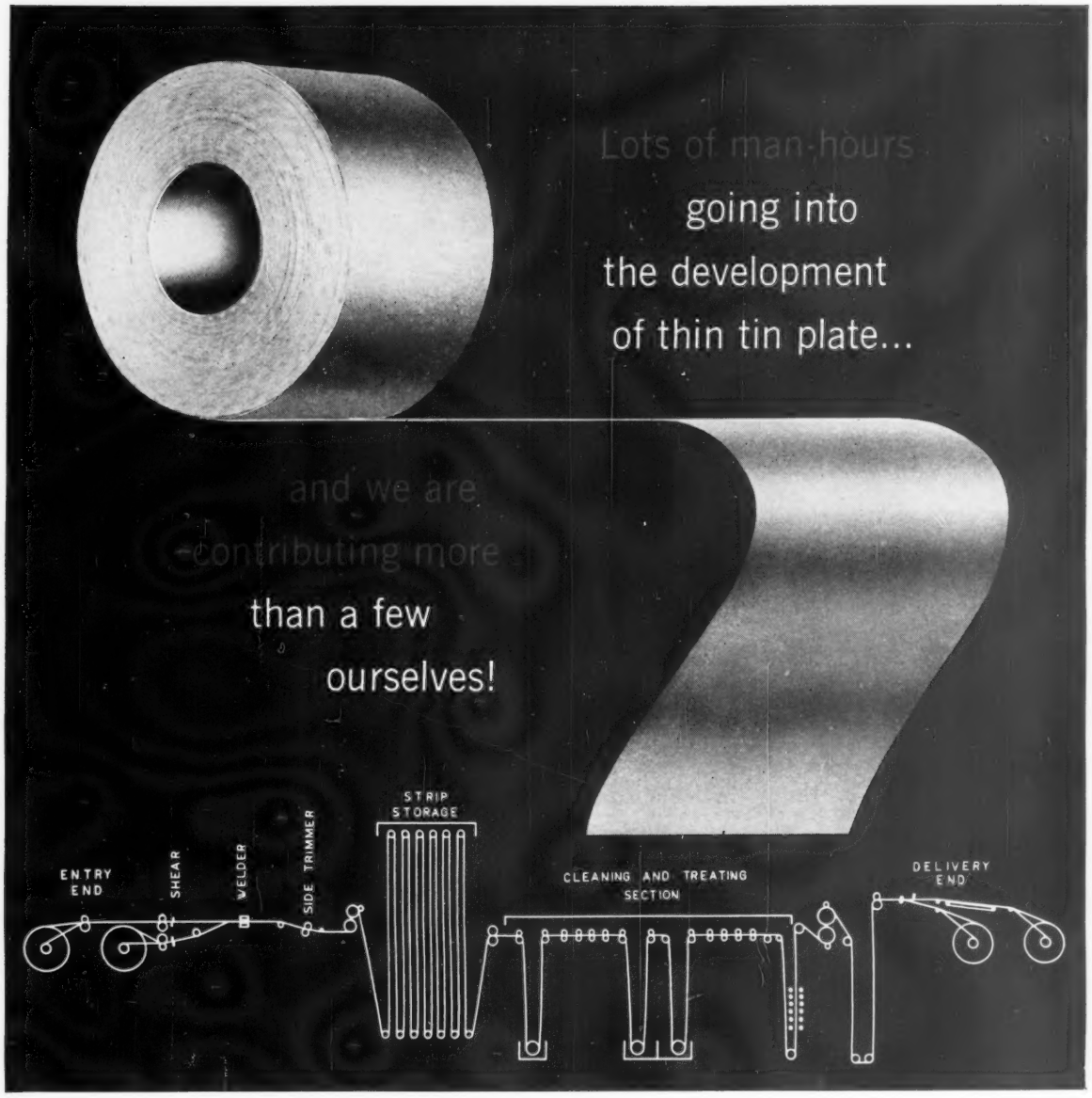
A DEVICE called a Retractor permits AGD (American Gage Design Committee) accuracy on most any application which would normally require a less accurate, long range model indicator.

Here are a few applications: 1. On shallow diameter gages to check OD or ID undercuts or recesses. 2. On dial snap, gage frames to check external gear or spline pitch diameters. 3. As a modified dial pin gage to check extra deep or narrow ID grooves. 4. On a comparator base to check wall thickness at the bottom of a deep cup cavity. 5. On special fixture gages where gage contacts must be retracted to facilitate unloading of the workpiece.

For further information, *write* Standard Gage Co. Inc., Poughkeepsie, N. Y.

Furnace Heats Slugs For Forging Press

JOBS such as heating small brass slugs for forging can be done on a Waltz continuous belt furnace. As slugs are heated in the furnace, the mesh belt carries them out the dis-



The trend toward new products, with emphasis on lightness and strength, puts the night lights back to work.

Lots of man-hours are going into these developments, such as thin tin plate and light wall pipe and tubing. We are contributing more than a few ourselves. We should. We are a major supplier of equipment, and what's good for the industries we serve is good for us.

More important, we do have a lot of knowledge and experience to draw on. We have been building equipment for handling and processing sheet and strip, as well as bars, tubes and pipe for a good many years.

300 Sixth Avenue
Pittsburgh 22, Pennsylvania

BLAW-KNOX

Aetna-Standard Division
BLAW-KNOX

Blaw-Knox designs and manufactures for America's growth industries: METALS: Rolling Mills • Steel Processing Lines • Rolls • Castings • Open Hearth Specialties • PROCESSING: Process Design, Engineering and Plant Construction Services • Process Equipment and Pressure Piping • CONSTRUCTION: Concrete and Bituminous Paving Machines • Concrete Batching Plants and Forms Gratings • AEROSPACE: Fixed and Steerable Antennas • Radio Telescopes Towers and Special Structures • POWER: Power Plant Specialties and Valves

DoALL Announces

Now the wraps are off! After months of intensive job studies DoALL brings you *Super* Demon to surpass the performance of anything you have ever known in high-speed steel saw bands. It's another great forward stride by the world's leader in band sawing machines and band tools.

Following laboratory tests, *Super* Demon has been field tested and enthusiastically endorsed by hundreds of experienced users.

Here's what typical users say

"Whenever cost per cut is a factor, Super Demon is the answer."

"For cut-off problem materials, Super Demon surpasses all others."

"We have standardized on Super Demon because it answers all of our cut-off needs."

Let *Super* Demon speak for itself

Now try it on your own work. Judge it on any basis you wish—cutting rate, cost per cut, accuracy, blade life. See how *Super* Demon can improve your production and cut costs.

Your DoALL Executive Tool Counselor can help you save time and money. Call him today at your local DoALL Sales-Service Store.

NEW—
EXCLUSIVE TUFFTRIDE® PROCESS

***Super* Demon owes its extra toughness** and hardness to a patented process of salt bath heat-treatment, employed exclusively by DoALL. Blades are custom welded to length with DoALL's stronger, guaranteed welds; cutting teeth are perfectly matched and protected by yellow plastic Saw Cap.

See it at ASTME Show, Booth 2222 New York Coliseum — May

SB-88

This is a typical DoALL Store

The DoALL Company, Des Plaines, Illinois

Call Your DoALL Sales-Service Store

charge end. The unit is supported by four legs.

Power requirements are 3 phase, 440 volts, 60 cycles. It draws about 50 kw. The power housing unit and control panel are mounted on the side of the furnace.

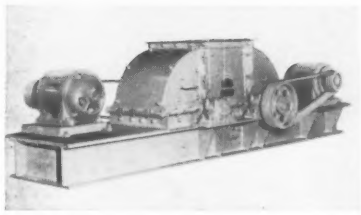
Doors on the entry and exit end of the furnace are raised and lowered by chain and sprocket arrangement (supported by uprights above the heating chamber). When closed, the doors have adequate clearance for slugs passing into the furnace on the conveyor.

For further information, *write* Dept. 9-3111, Waltz Furnace Co., 1901 Symmes St., Cincinnati 6, Ohio.

Crusher for Wet Material Doesn't Plug or Cake Up

PROBLEMS of plugging and caking in the fine reduction of wet or sticky materials has been licked by the Twin-Rotor Impactor.

The unit has no cage bars or

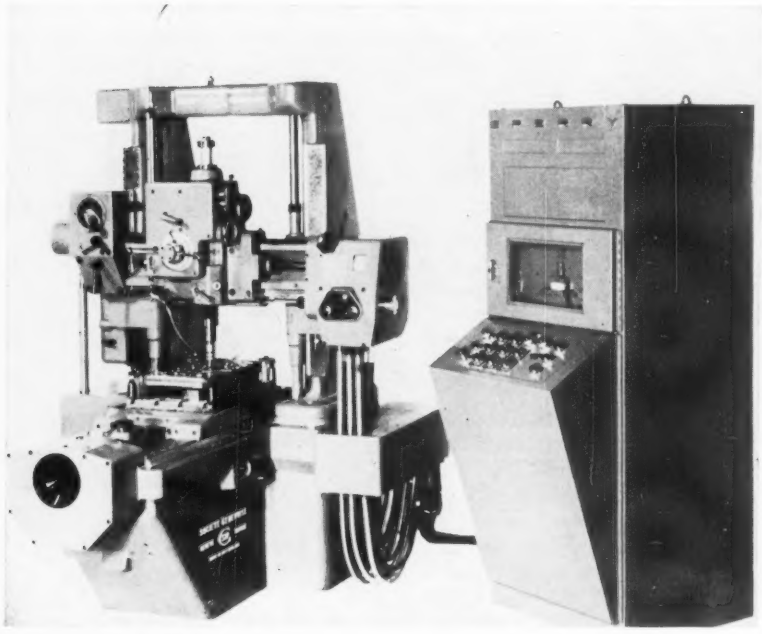


grates to plug. Crushing is by impact only as the material passes through the crusher and receives blows from the whirling hammers on twin rotors.

Wear liners are offset from the frame so that gas torches can be played into the spaces between the liners and the frame. That prevents wet materials from sticking to the hot liners.

Two sizes are available for rated capacities to 100 tons per hour. The unit does not vibrate during operation. Heavy concrete foundations are not required.

For further information, *write* Pennsylvania Crusher Div., Bath Iron Works Corp., West Chester, Pa.



Numerical Control Speeds Jig Borer

POSITIONING accuracy within 80 millionths of an inch and repeatability within 50 millionths of an inch are features of the No. 3K-CN jig borer. The machine can be set to a prescribed position by pressing a single button.

A punched tape provides automatic positioning of the table and spindle head. The tape carries coordinate data in the form of information blocks for each positioning cycle. The company says tape control takes the precision machine out of the toolroom and makes possible quantity production.

The tape controlled program includes the automatic hydraulic unclamping, positioning, and reclamping of the table and the spindle head saddle. As soon as the operator presses the "next position" pushbutton, the tape is read and the positioning cycle is initiated. The jig borer uses a numerical control system made by Sperry Gyroscope Co. of Canada Ltd.

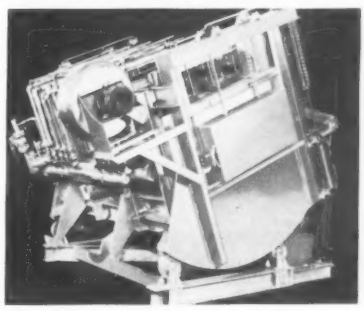
For further information, *write* American SIP Corp., 100 E. 42nd St., New York 17, N. Y.

Tilt Type Melting Furnace Improves Metal Quality

A TILT type melting furnace (designated RTPW) is designed to deliver molten aluminum or magnesium with high purity, low porosity, and less than 1 per cent metal loss.

The company says the Pre-Temp hearth with automatic, dual stroke, ingot loader minimizes oxide inclusions and hydrogen absorption; it also reduces bath temperature variation. In addition, the efficiency of the firing method results in low fuel consumption (about 1000 Btu per pound) and reduces operating costs.

It's equipped with a special remelt well for melting runners, gates,



and biscuits. The remelt well is separated from the main bath by allowing only subsurface metal flow.

The tilting mechanism is hydraulically operated and completely controlled for smooth, even metal flow. Either cradle or nose tilt motion can be provided. The spout design releases only clean metal from below the bath surface and permits complete emptying with only a 20 degree arc of tilt. Units are available with capacities up to 2000 lb per hour.

For further information, *write* Kozma Co., 2471 Wyoming, Dearborn, Mich.

Plastic Coating Protects Stainless Steel Sheets

A PLASTIC protective coating for stainless steel sheets and strip is said to lower costs and also provide the qualities of a lubricant during fabricating processes such as roll forming or press braking.

The strippable plastic is available on stainless steel coils or cut lengths in gages from 0.018 to 0.050 in. in widths up to 42 in.

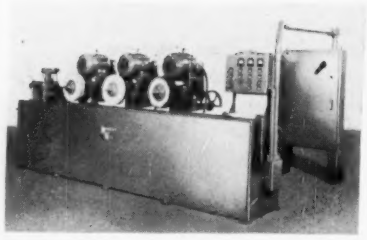
For further information, *write* Washington Steel Corp., Washington, Pa.

Comparator Checks Out Polishing and Buffing

IDEAL production speeds, work pressures, and feed rates for polishing and buffing operations can be accurately determined in advance of actual production runs by a frictionfree comparator machine.

The unit (built by Murray-Way) may also be used to test workwheels, horsepower usage, buffing and polishing compounds, and production parts or materials to assure that they meet specifications.

A conveyor moves the sample materials past a scouring head and three buffing heads. Wheel pressure is adjustable and frictionfree. Once wheel pressure is selected, it



remains constant. With machine inertia and drag eliminated, the control panel readings are exact and dependable. Spindle torque and wheel pressure can be quickly and accurately determined. The scouring head uniformly roughens the surface of sample materials for reuse in the testing.

For further information, *write* Murray-Way Corp., P. O. Box 180, Birmingham, Mich.

Gas Economy Feature of Welder Control System

GREATER economy in gas consumption and reduced operator fatigue results from a centralized control system adapted to the Airco 725 valveless welding torch. The company says the unit can handle practically all welding and brazing jobs for production lines.

Needle valves have been eliminated from the torch assembly. A Gas-Mizer is used with the modified torch and flame adjustment is made at the regulators on the gas cylinder or pipeline station. The Gas-Mizer, between the gas supply and the torch, closes off the fuel mixtures whenever the torch is hung on the hanger arm hook. When picked up, the gas flow starts. A pilot light ignites the torch.

For further information, *write* Air Reduction Sales Co., a division of Air Reduction Co. Inc., 150 E. 42nd St., New York 17, N. Y.

Firebricks Suited for Prepared Atmospheres

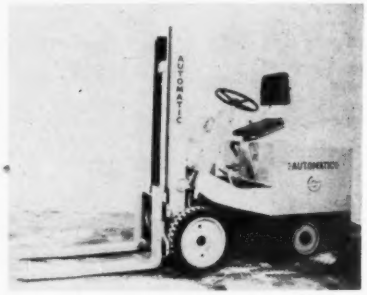
TWO TYPES of firebricks suitable for direct exposure and backup insulation in prepared atmosphere furnaces have been announced by Johns-Manville. One, JM-23, is for service up to 2300° F; the other, JM-20, is for service up to 2000° F.

Both are made from clays having low iron content and are lightweight with uniform pore structure, low heat storage capacity, and low thermal conductivity.

For further information, *write* Johns-Manville, 22 E. 40th St., New York 16, N. Y.

Drive Gears on Lift Trucks Are Accessible

A DRIVE axle that is a combination helical, bevel, and spur gear assembly is featured on the electric Model ELF and gasoline Model GLF lift trucks. The gear assembly is entirely enclosed and runs in oil. All gears are accessible for removal without dismounting the axle from the frame. The trail axle and drive unit is equipped with Timken tapered roller bearings. The lift trucks are available in capacities up to 5 tons.

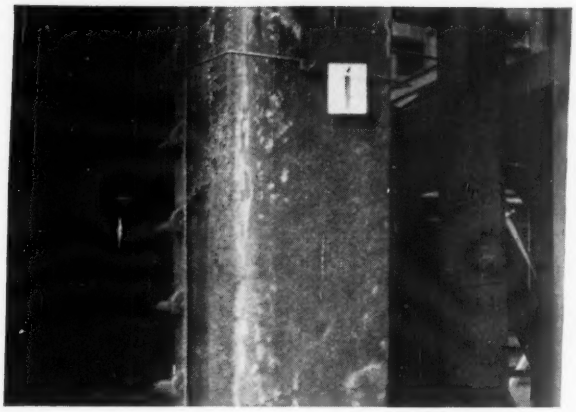


For further information, *write* Automatic Transportation Co., 149 W. 87th St., Chicago 20, Ill.

Strapping Machines Fit Into Automatic Setups

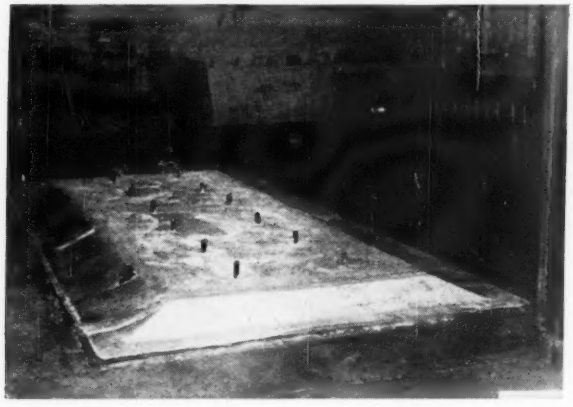
COMPLETELY air powered and electrically controlled, the Model F7 strapping machine is compact. It weighs only about 75 lb. The company says it's capable of handling any degree of automation desired in a strapping installation. The unit shown is a simple setup with the basic strapping mechanism side mounted on a pipe stand (conveyor height) and equipped with controls for semiautomatic operation.

More sophisticated F7 machines can include the basic strapping mechanism mounted in top or side



B&W Kaocrete-D, vibrated in place, provides high resistance to the atmospheres encountered in this coke oven door installation. Furthermore, the high erosion resistance and long service life without loss of strength of B&W Kaocrete-D add to its suitability in this application.

A typical monolithic curb wall construction in an annealing furnace using a carbon monoxide atmosphere. The greatly reduced number of joints in which sealing sand can penetrate prevents structural spalling of B&W Kaocrete-A upon heating and cooling. Being monolithic, gas leaks are practically eliminated.



A radiant tube annealing furnace with a base of Kaocrete-A, backed up with Kaolite-20, one of B&W's insulating refractory castables. This furnace operates at approximately 1700 F in a 65% CO atmosphere.

A stack annealing furnace with pedestals cast of B&W Kaocrete-A. The atmosphere is slightly above 8% CO. B&W Kaocrete-A offers strength, volume stability and resistance to carbon monoxide disintegration.

How B&W refractory castables perform in atmosphere applications

One of the difficult problems facing furnace builders and operators in the metals industries is the effect of atmospheres on refractory linings. That's why B&W offers several *specialized* refractory castables for this service, each possessing strength, volume stability and the refractoriness necessary to assure long, trouble-free service.

Take B&W Kaocrete-A, for example. Because of the careful selection and processing of special aggregates and other ingredients with low iron content, this material resists disintegration or other effects produced by high concentrations of CO or H_2 atmospheres. B&W Kaocast and Kaocrete-32 provide the same excellent service at higher temperatures while lightweight Kaolite-20 is outstanding as an insulating castable in atmosphere applications.

B&W Bulletin R-35A gives additional information on versatile B&W refractory castables. Write for your copy of this bulletin to The Babcock & Wilcox Company, 161 East 42nd Street, New York 17, N. Y.

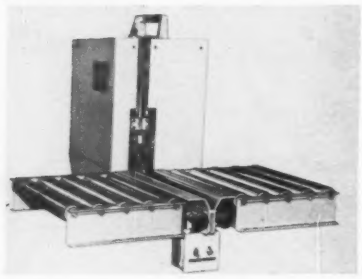
R832

B&W

THE BABCOCK & WILCOX COMPANY

REFRACTORIES DIVISION

B&W Firebrick, Insulating Firebrick, and Refractory Castables, Plastics, Ramming Mixes, Mortars, and Ceramic Fiber.



positions, package circling tracks, and controls for fully automatic strapping.

For further information, *write* Acme Steel Co., 135th Street and Perry Avenue, Chicago 27, Ill.

Rubber Base Sealers Fit into Corners Easily

TWO, extruded, rubber base sealers have double doughnut design that permits positive sealing of uneven or tapered joints, and 90 degree bending. They don't have to be cut and fitted.

The sealers, made by 3M, are called EC-2121 (hollow version) and EC-2131 (solid version). They're designed to seal between mating metal surfaces. The company says the sealers will readily conform and provide an excellent seal around corners without the need for splicing or special fitting. Both sealers have good moisture, salt spray, and weathering resistance.

For further information, *write* Adhesives, Coatings & Sealers Div., Minnesota Mining & Mfg. Co., 900 Bush Ave., St. Paul 6, Minn.

5000° F Furnace Designed For Electronic Devices

SEMICONDUCTORS and other electronic devices can be produced with a vertical graphite element furnace developed by Lindberg. The unit is rated for temperatures up to 5000° F.

Other applications for the furnace include calibration work on radiamatics, experimental studies of high temperature chemical reaction, firing of pyrolytic graphite, and as an experimental tool for study of compression of material at elevated temperatures.

The graphite element is 5 in. ID by 18 in. high with a 6 in. effective work height at ±25° F. The bottom loading graphite work hearth is 4¼ in. OD and is raised and lowered by a handwheel.

For further information, *write* Semiconductor Equipment Div., Lindberg Engineering Co., 2444 W. Hubbard St., Chicago 12, Ill.

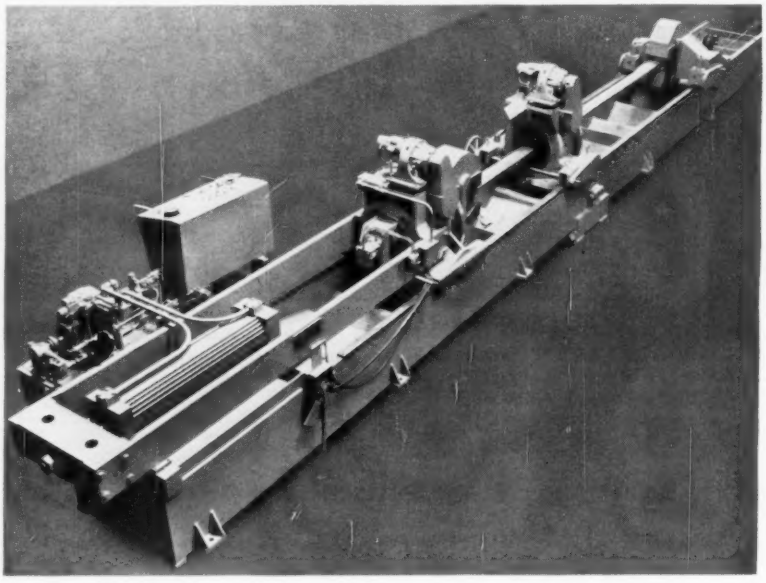
Polishing Machine Handles Material in Sheets

SHEET type materials can be finished on the Model S-101 automatic polishing machine. Polishing is done by an oscillating and rotating wheel drum made of abrasive impregnated nylon.

The wheel drum is positioned over the work for maximum ease of adjustment. The drum is quickly and easily removed for changing grade or renewing the abrasive.

Lowering and raising the drum (by air cylinder) is controlled by an automatic sensing device. Oscillation of the drum is infinitely variable from 0 to 200 oscillations per minute with ⅜ in. lateral movement. A built-in dresser makes it easy to true and clean the abrasive. Feed rate ranges from 20 to 69 fpm. Stock up to 61 in. wide and 3 in. thick can be accommodated.

For further information, *write* Yates-American Machine Co., 701 Fourth St., Beloit, Wis.



Unit Stretches, Twists Spar Sections

A WIDE range of aircraft and similar spar sections can be shaped with precise control on the hydraulic stretching and twisting machine shown. It's used to process extruded aluminum alloy rotor spars up to 30 ft long.

It has a 400,000 lb stretching capacity and a 200,000 in.-lb torque capacity. Stretching speed is infinitely variable up to 25 in. per minute, while twisting is performed at the rate of ¼ rpm.

An intermediate head (movable along the entire bed) can be engaged at any point of the spar. With the device, a predetermined portion of the spar can be twisted or detwisted by itself, making it possible to produce two or more different helix angles over the entire spar length.

For further information, *write* Loma Machine Mfg. Co. Inc., 114 E. 32nd St., New York 16, N. Y.

This mark tells you a product is made of modern, dependable Steel.

Now Available...

USS QUENCHED AND TEMPERED STRUCTURAL SHAPES

in such grades as "T-1", "T-1" type A, 9% Nickel and HY-80 Constructional Alloy and Armor Steels

Announcing another industry "first" for United States Steel—USS Quenched and Tempered Alloy and Armor Steel Structural Shapes are now commercially available for the first time anywhere, in the types and sizes shown in the accompanying tables. The more commonly used sizes of American Standard Beams, Channels, Equal Angles and Unequal Angles will be produced in these USS Steels: "T-1", "T-1" type A, 9% Nickel, HY-80 and certain other alloy grades that provide desirable mechanical properties after quenching and tempering. Later, other sizes and shapes will be added according to demand.

These quenched and tempered alloy and armor steel structural shapes (see table below) can simplify design and result in substantial weight savings, increased structural strength and reduced shipping and handling costs. For a free folder about any of these steels or their structural shapes, contact your local USS representative or write to United States Steel, Room 6308, 525 William Penn Place, Pittsburgh 30, Pa. USS and "T-1" are registered trademarks

United States Steel Corporation • Columbia-Geneva Steel Division • Tennessee Coal & Iron Division • United States Steel Supply Division • United States Steel Export Company

Availability Quenched and Tempered standard structural shapes are available in the following shapes and sizes:

I	Beams: 6″ to 12″ inclusive	American Standard Sections and Foot Weights*
[	Channels: 6″ to 15″ inclusive	American Standard Sections and Foot Weights*
L	Equal Angles: 3″ to 8″ inclusive	Standard Sections*
L	Unequal Angles: 3½″ x 3″ to 8″ x 6″ inclusive Maximum Length 40′ for all sections	Standard Sections*

*See our booklet, "USS Shapes & Plates," ADUCO-27001

Mechanical Properties of Quenched and Tempered Alloy and Armor Steel Structural Shapes

	Yield Strength, psi	Tensile Strength, psi	Elong. in 2", % min.	Reduction of Area, % min.	Longitudinal Charpy Impact (when specified)	
					Keyhole	V-notch
"T-1" Steel 2½" and Under	100,000 (min.)	115,000/140,000	18	55①	15 ft.-lbs. @ −50F	30 ft.-lbs. @ +10F
"T-1" type A 1" and Under	100,000 (min.)	115,000/140,000	18②	45②	15 ft.-lbs. @ −50F	—
Grade A 9% Nickel	60,000 min.	90,000 min.	22% min.	—	15 ft.-lbs. @ −320F	20 ft.-lbs. @ −320F
Grade B 9% Nickel	65,000 min.	95,000 min.	20% min.			
HY-80 ¼"-2" Incl.	80,000/100,000③	—	19④	—	—	70 ft.-lbs. @ − 20F

①¾" and under—45% min.
②½" and over, yield strength range is 80/95,000 psi
③¾" to 1" inclusive, elongation 16% min.
④½" to 2" inclusive, elongation 20% min.
⑤¾" to 1" inclusive, 55% min.

USS United States Steel

At Longhorn Portland Cement Co. plant, San Antonio, Texas, this 22-ton Plymouth locomotive hauls limestone rock from quarry to plant 55-hours a week, all year 'round.

"Plymouth Diesel makes over 17,000 round-trips per year — keeps production rolling smoothly"

"Hauling 4800 tons of limestone rock per day from quarry to mill calls for plenty of speed, power and stamina on the part of the industrial locomotive doing the job," says Mr. Gaines Voigt, superintendent of the Longhorn Portland Cement Company plant, San Antonio, Texas.

"A 22-ton Plymouth Diesel equipped with Torqomotive Drive performs this task for us efficiently and economically—makes a round-trip of more than one-mile every 8½ minutes to keep production rolling smoothly. Our Plymouth pulls 6 cars at a time—72 tons per load—completes over 17,000 round-trips per year under rugged operating conditions."

Find out today how Plymouth's high operating efficiency and low operating cost can make your hauling, switching and spotting jobs more profitable. For complete information on a Plymouth built specifically to meet your haulage needs, simply send a brief outline of your operations to: The Fate-Root-Heath Company, Dept. A-1 Plymouth, Ohio. Purchase plans are available on gasoline and Diesel models.

RAIL POWER

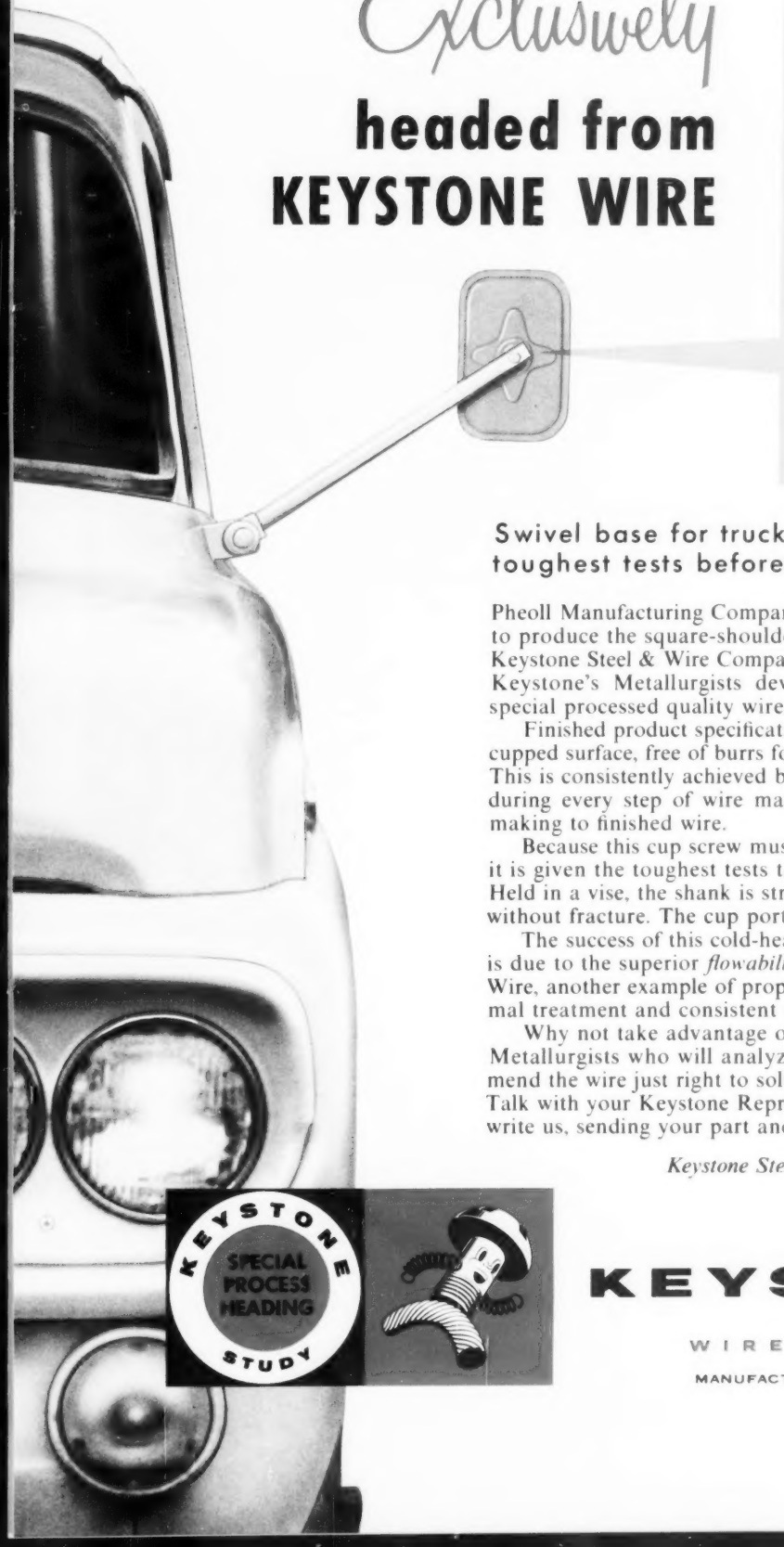
PLYMOUTH® LOCOMOTIVES

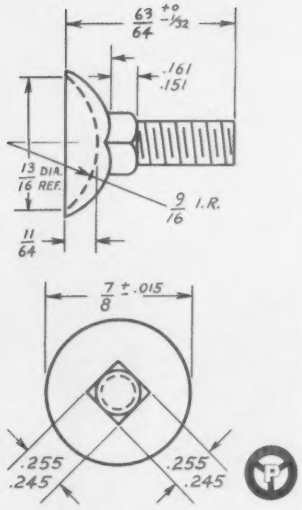
WITH TORQOMOTIVE DRIVE

ALSO BUILDERS OF F-R-H CERAMIC MACHINERY

PLYMOUTH LOCOMOTIVES in Progressive Industry throughout the world

Exclusively
headed from KEYSTONE WIRE





Pheoll Manufacturing Company, Inc.

Swivel base for truck rear view mirror passes toughest tests before it hits the road!

Pheoll Manufacturing Company, Inc., Chicago, Illinois, assigned to produce the square-shouldered cup screw shown here, asked Keystone Steel & Wire Company for the exact cold heading wire. Keystone's Metallurgists developed double extrusion coated special processed quality wire.

Finished product specifications called for a uniformly smooth cupped surface, free of burrs for proper adjustment of the mirror. This is consistently achieved by Keystone Wire's quality control during every step of wire manufacture from open hearth steel making to finished wire.

Because this cup screw must withstand the rigors of the road, it is given the toughest tests to check head stress and ductility. Held in a vise, the shank is struck repeatedly until it is bent 90° without fracture. The cup portion gets similar treatment.

The success of this cold-headed square shouldered cup screw is due to the superior *flowability* of Keystone Special Processed Wire, another example of proper chemical analysis, correct thermal treatment and consistent uniformity throughout every coil.

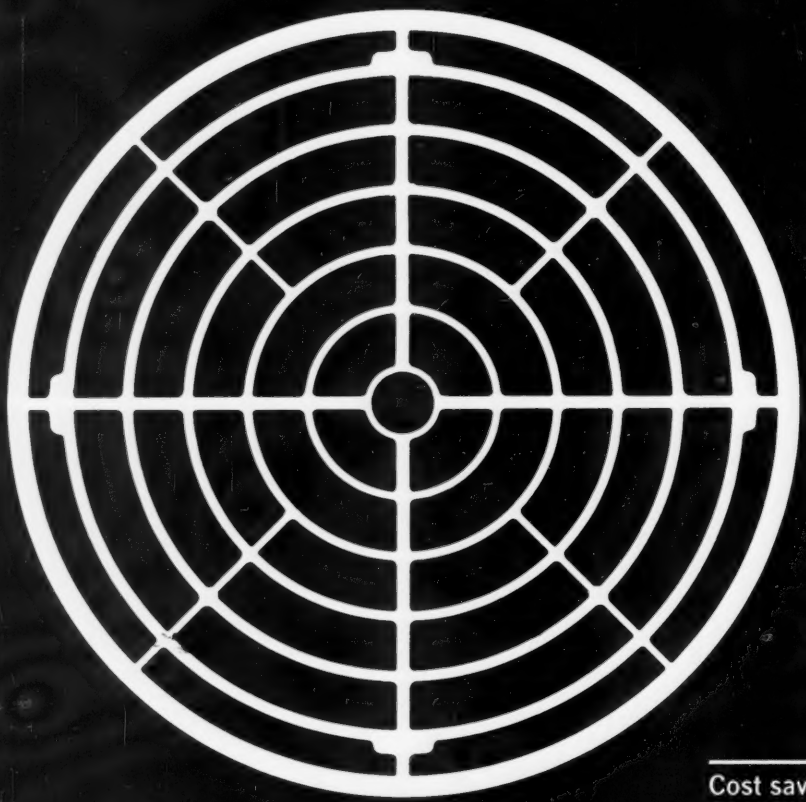
Why not take advantage of the service offered by Keystone Metallurgists who will analyze your specifications and recommend the wire just right to solve your particular wire problems? Talk with your Keystone Representative for complete details, or write us, sending your part and blue prints, if possible.

Keystone Steel & Wire Company, Peoria, Illinois

KEYSTONE

WIRE FOR INDUSTRY

MANUFACTURED AT PEORIA, ILLINOIS, U. S. A.



Cost saving: 33%

"are you getting your metal's worth?"

The intake tubes of the Waterous Company's model CMB fire pump suck in **1250** gallons of water a minute. Rocks and other foreign matter can get sucked in too—which would have disastrous effects on the pump. A screen is needed on the intake tubes, a screen that's tough and corrosion resistant, with extra-thin vanes and a smooth surface for unimpeded water flow.

Originally these screens were fabricated from sheet brass, with the vanes brazed together. An expensive material and method for a simple but important component. **Today these screens are die cast of Zamak at a cost saving of 33%** by Twin City Die Casting of Minneapolis. The tapered vanes have a minimum wall thickness of 1/32 of an inch. Zamak is the only die casting material that can fill these thin sections and still provide the strength, corrosion resistance and smooth "as cast" surface necessary.

To find out how you can put zinc die casting to work cutting your production costs, write today to The New Jersey Zinc Company for your set of Zamak technical data books detailing the properties, use, design techniques and machining practices of the Zamak alloys. Remember—Zamak gives you more for less. Are you getting your metal's worth?

HORSE HEAD® SPECIAL ZINC AND HORSE HEAD ZAMAK ARE PRODUCED BY

THE NEW JERSEY ZINC COMPANY

160 FRONT STREET • NEW YORK 38, N. Y.

DEVELOPERS OF THE ONLY STANDARD ZINC DIE CASTING ALLOYS IN USE TODAY

HORSE HEAD PRODUCTS

NEW literature

Write directly to the company for a copy

Bearing Data

A directory and technical handbook on miniature ball bearings furnishes comprehensive information on more than 500 types and sizes of miniature and instrument size bearings. Miniature Precision Bearings Inc., Keene, N. H.

Tapered Tubing Data

Straight and reverse tapered tubing ranging in size from 0.080 to 1.500 in. OD is described in Data Memorandum No. 29. Superior Tube Co., 1585 Germantown Ave., Norristown, Pa.

Insulating Firebricks

A complete discussion of the advantages of insulating firebricks, as well as charted information on a wide variety of applications, is included in a 35 page bulletin (R-38). Refractories Div., Babcock & Wilcox Co., 161 E. 42nd St., New York 17, N. Y.

Metal Clad Switchgear

Bulletin GEA-5664F (42 pages) provides features, installation data, dimensions, and ratings for switchgear ranging from 2.3 to 13.8 kv and 75 to 1000 mva. General Electric Co., Schenectady 5, N. Y.

Hardfacing Electrodes and Wires

A 44 page brochure (ADC 955) classifies and illustrates all hardfacing materials. Wear protection provided on industrial and construction equipment by Airco hardfacing alloys is discussed in detail. A description of each electrode is presented along with application data. Air Reduction Sales Co., a division of Air Reduction Co. Inc., 150 E. 42nd St., New York 17, N. Y.

Tape Controlled Drilling Machines

Six and eight spindle machines with capacities of ¾, 1¼, and 1½ in. are described in a 16 page bulletin. Specifications for ten tape controlled systems together with four pages of case histories of installations are also covered. Burgmaster Corp., 15001 S. Figueroa St., Gardena, Calif.

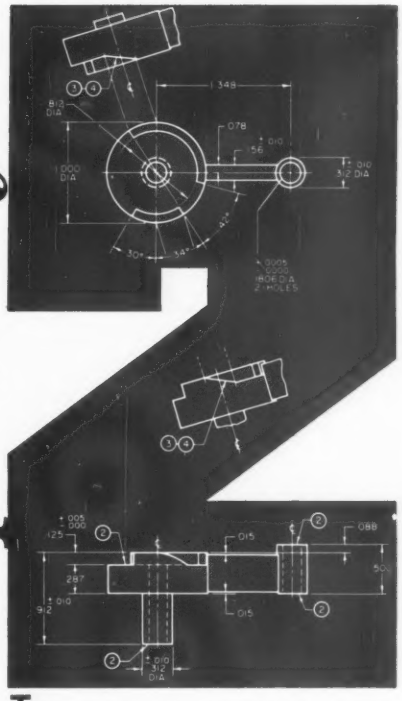
Carbon and Graphite Applications

"Carbon and Graphite for High Temperature Applications" describes the properties and various grades of carbon and graphite. It reviews their application in machining molds, dies, crucibles, sintering boats, and other items that require resistance at high temperatures. Speer Carbon Co., St. Marys, Pa.

Semiconductor Alloy Preform Selector Chart

A selector chart lists 56 different alloys arranged in order of solidus and liquidus temperatures. Accurate Specialties Co. Inc., 345 Lodi St., Hackensack, N. J.

blueprint for



The blueprint shown above is for a phonograph motor toggle link pressed from brass powder by American Powdered Metals Inc. for the General Industries Company. Why blueprint for two? Because it combines 2 design functions—structural support and cam surface—in a single part. Because powder metallurgy is the only economically practical way to make this part—and it could not have been achieved without design teamwork between the customer and the metal powder fabricator.

Teamwork produced a precise, intricate part assuring exact turntable speed and providing a cam surface which controls speed selection. The cam surface must be smooth and accurate—and stay that way. Holes must parallel and round to within .0005" total indicator reading. Hole centerlines must be parallel to each other within .002" T.I.R. Brass powder supplies the properties necessary for these requirements with its ideal combination of structural strength and self-lubrication.

Working together, the metal powder fabricator and design engineer make economical mass production of critical parts a reality. And we also mean "critical" in the sense that a whole is no better than the quality of its most prosaic part. For more information about the design, application and advantages of nonferrous metal powder parts, write today to The New Jersey Zinc Company for your copy of "Designing For Pressed Brass and Nickel Silver Parts."

HORSE HEAD® ATOMIZED NONFERROUS METAL POWDERS ARE PRODUCED BY

THE NEW JERSEY ZINC COMPANY

160 FRONT STREET • NEW YORK 38, N. Y.

DEVELOPERS OF BRASS & NICKEL SILVER POWDERS SETTING TODAY'S STANDARDS

HORSE HEAD PRODUCTS

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STEEL
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WIRE
CF&I
STEEL
WIRE

CF&I Spiders and Fibre Drums are packaged for your production

RETURNABLE SPIDERS

Here's the experience of one typical user:

> "When we used small coils, we lost several feet every time we changed a coil. Now, using CF&I Spiders, we have cut our waste 80%. We've also improved the quality of our end product because we don't have to reset the machine. CF&I Spiders have reduced our handling and storage problems, too, because you've got a lot of wire in one easy-to-handle package."

CF&I-Wickwire Returnable Spiders hold 2000 to 3000 lbs. of wire in one continuous length . . . consist of a center core welded to a heavy base plate. Available in two standard types from our mills—with core diameters of 18″ and 22″.

OPERATING ADVANTAGES: Increased production, decreased labor, less scrap loss, ease of handling and improved quality of end products.

FIBRE DRUMS

Here's what one satisfied user said about CF&I Fibre Drums:

> "They're an answer to the problem of unclean wire. The metal cover and locking band protect the wire from grime and other corrosive elements. The fact that they hold up to 600 lbs. of wire in one continuous length enables us to run our machines for a longer time than when we used small coils."

Fibre Drums hold 250 to 600 lbs. of wire in one continuous length . . . consist of a sturdy fibre container with center core, metal cover and locking band which protect the wire from atmosphere and dirt. The wire is directly withdrawn from the drum into your equipment. Available in full and half drums.

OPERATING ADVANTAGES:

- Cleaner wire, because the sealed drum protects the finish on the wire.
- Increased production, because of smooth pay-off and the fact that your machines have less downtime than with conventional coils.
- Less storage space required, because Fibre Drums can be stacked compactly on each other.
- Quick, easy handling . . . drums can be shipped strapped to a wooden pallet for convenient handling by a fork-lift truck.

ONLY CF&I OFFERS A TOTAL OF TEN DIFFERENT WIRE PACKAGES. You've just read how two of these packages have increased the production efficiency of leading manufacturers. One or more CF&I-Wickwire Wire packages can do the same for you. Our engineering staff will be happy to study your operation and recommend the type that best meets your requirements. For complete details, write your local CF&I sales office.

CF&I STEEL MADE IN U.S.A.

THE COLORADO FUEL AND IRON CORPORATION
Denver • Oakland • New York
Sales Offices in Key Cities

Steel

PRIVATE EYE FOLLOWS RED CIRCLE ORDERS

The men of Acme-Newport are constantly tailing customer orders red-circled for preferential handling. Even the best regulated inventories develop unexpected gaps; and for that, *Red Circle Service* is your answer. Modern facilities, flexible scheduling and central location enable Acme-Newport to replenish your stocks of coils or sheets in a matter of days. Full speed ahead for these special orders, while maintaining every quality safeguard throughout the steelmaking process. When you need it good and you need it fast, call for *Red Circle Service*.

Steel

PRODUCTS OF ACME-NEWPORT STEEL

Hot Rolled Steel in Coil	Cold Rolled Steel in Coil *(full hard only)*	Plates (3/16" *and lighter*)
Hot Rolled Pickled Steel in Coil	Cold Rolled Sheets	Electrical Sheets
Hot Rolled Sheets	Alloy Sheets and Plates	Electric Weld Line Pipe
Hot Rolled Pickled Sheets		Spiral Welded Pipe

Acme-Newport Steel COMPANY

NEWPORT, KENTUCKY

A SUBSIDIARY OF ACME STEEL COMPANY

Uptrend to Continue in June

MAY is shaping up as the steel industry's best month in a year, and prospects are good that June will be even better.

A few weeks ago, steelmakers believed demand might weaken slightly in June. Now some say that their orders for next month are 30 per cent ahead of the volume they had on their books for May at the corresponding time in April. Not all mills report such impressive gains, but most of them are doing at least as well as they were a month ago. So it's almost a certainty that June shipments will exceed May's.

AUTOMOTIVE OUTLOOK— Continued strong demand from automakers is the main reason for the improved June outlook. The car companies are expected to build about as many autos next month as they'll assemble in May (more than 500,000). Sales are projected at about the same rate, so dealer inventories should stay close to the 900,000 level through July. That's about 250,000 more cars than the industry normally has in stock at that time, but STEEL's Detroit sources think the higher inventory will be maintained as insurance against a possible strike.

SWITCH TO NEW MODELS— Look for Chrysler Corp. and American Motors Corp. to finish their 1961 model runs in July. Ford Div. may follow suit on its standard sized cars. The rest of the automakers will phase out this year's models in August and early September. Barring a strike, the bulk of 1962 model production will start in September, with car introductions scheduled from early September to mid-October. Purchasing plans call for little stockpiling of steel during the next two months. General Motors Corp. is maintaining a 15 to 20 day float of flat rolled stock. It may increase its inventory slightly in June if the mills start to extend their delivery promises.

OTHER BUYERS ACTIVE— Even the most conservative steelmen are encouraged by the breadth of the market's recovery. Some mills are getting more new business from the construction industry and appliance manufacturers than from the automakers. Cold rolled sheets, galvanized items, and tin plate are in strong demand. In the Chicago area, there's renewed interest in line pipe as gas transmission companies move ahead with expansion programs. In the East, structural shapes and reinforcing bars are on the upswing. Only plates, commercial bars, and wire products are lagging.

QUICK SHIPMENTS CONTINUE— Although steelmakers are quoting extended deliveries on tin plate and galvanized sheets, they're still promising quick service on most products. Major producers don't have the flexibility that they had earlier in the spring, but they can take more business without falling behind. They're quoting three to five week delivery on cold rolled sheets and two to three weeks on hot rolled.

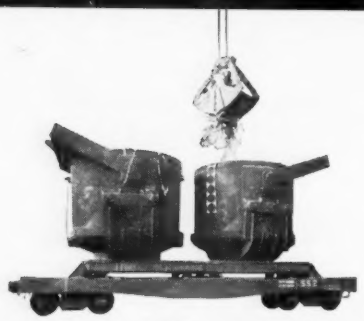
But there are exceptions. Says a medium sized mill: "The only way we can keep pace is by going to three turns a day, and we don't have enough of a backlog for that. When we had hot bands, we were able to take some orders for cold rolled sheets that specified three week delivery. Now that we've depleted our inventory of in-process material, we're talking four to five weeks."

PRODUCTION GAINS—Look for ingot production in the week ending May 27 to exceed the 2,025,000 tons that STEEL estimates the industry poured in the week ended May 20. Output then was up 1.9 per cent from the previous week's.

WHERE TO FIND MARKETS & PRICES

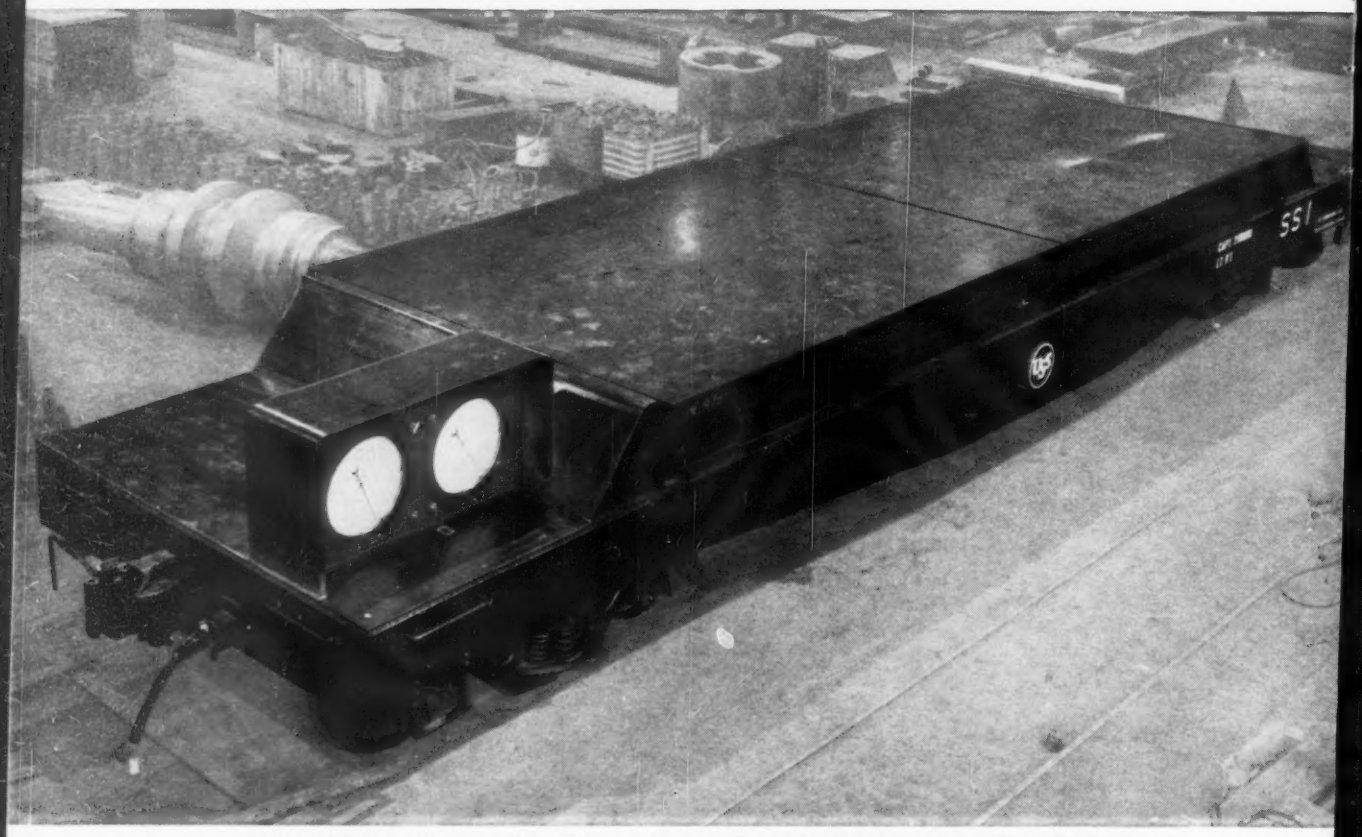
	News	Prices
Bars, Merchant	159	167
Reinforcing	...	168
Boiler Tubes	...	170
Canada	...	173
Charts:		
Finished Steel	...	165
Ingot Rate	164	...
Scrap Prices	...	177
Clad Steel	...	171
Coal Chemicals	...	173
Coke	...	173
Comparisons	...	165
Contracts Placed	162	...
Contracts Pend.	162	...
Electrodes	...	173
Exports	183	...
Fasteners	...	170
Ferroalloys	...	*
Fluorspar	...	173
Footnotes	...	170
Imported Steel	...	173
Ingot Production	164	...
Metal Powder	...	173
Nonferrous Met.	180	182
Ores	162	173
Pig Iron	174	172
Piling	...	167
Plates	159	167
Plating Material	...	183
Prestressed Strand	...	170
Price Indexes	...	165
Producers' Key	168	...
R.R. Materials	...	170
Refractories	...	173
Scrap	177	178
Semifinished	...	167
Service Centers	160	172
Sheets	158	168
Silicon Steel	...	169
Stainless Steel	...	171
Strip	158	169
Structurals	162	167
Tin Mill Prod.	...	169
Tool Steel	174	171
Tooling Plate	183	...
Tubular Goods	158	172
Wire	160	169

*Current prices were published in the May 15 issue and will appear in subsequent issues.



This mark tells you a product is made of modern, dependable Steel.

this car is a traveling all-purpose weigh platform



At McLouth Steel, stainless scrap is loaded and weighed to within two-tenths of one percent accuracy. This double operation, performed right in the yard, cuts handling time in the mill and gives them better control of charging mixtures.

Weigh anything up to 100 tons, anywhere on the track, with this new, all-purpose weigh car. It can handle one 100-ton load or two 50-ton loads to within two-tenths of one percent accuracy. You can use it anywhere because the load cells are hydraulically operated and need no power. A weigh car pays for itself by eliminating guesswork and human error.

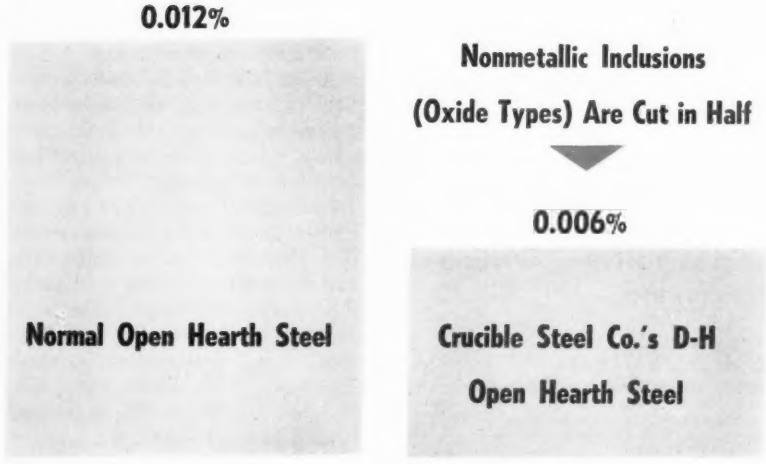
The McLouth Steel Corporation, Detroit, Michigan, uses this weigh car to predetermine the exact weight of stainless steel scrap and other expensive alloying ingredients. They cut handling time because weighing is done right in the yard. Weight records give them better control of inventory and charging mixtures and make it easier to find the yield cost. Other steel producers cut costs by weighing electric furnace charges and products to control yields. This all-welded, stress-relieved steel car will stand up in all of these uses and give long, dependable service.

USS Weigh Cars and other industrial cars are built to last by United States Steel, a company that also *uses* them! We can custom design and build any type weigh car to best suit your needs. Send your weight problems to United States Steel, 525 William Penn Place, Pittsburgh 30, Pennsylvania. United States Steel Corporation, Pittsburgh · Columbia-Geneva Steel, San Francisco · Tennessee Coal & Iron, Fairfield, Alabama · United States Steel Export Company

USS TRADEMARK

United States Steel

Crucible Adds to Line of Superclean Steels



NOW YOU can buy steel with high qualities that come from vacuum processing at a moderate premium in price—probably less than $20 a ton above normal electric furnace steel.

The material is a product of the new Dortmund - Horder vacuum treatment unit at the Midland, Pa., plant of Crucible Steel Co. of America, Pittsburgh.

The quality of D-H products is somewhere between that of air melted electric furnace steel and the vacuum arc remelted steel, says Crucible. A high degree of uniformity is maintained throughout each heat and from heat to heat.

• **Customer Benefits** — Uniformity and excellent mechanical properties will pay off in reduced rejections at the customer's plant. The user of the end product can expect improved reliability and a reduction in premature failures, Crucible asserts.

Immediate markets are expected to include producers and designers of tools, machinery, electrical equipment, and automobiles. Crucible will continue to produce vacuum melted steels to supply the needs of aircraft and missilemakers.

D-H steels get their high mechanical properties through cleanliness (via the removal of oxygen and other gases) and the subsequent addition of alloys in the vacuum. Alloying after the removal of gases prevents formation of unwanted nonmetallic inclusions, Crucible explains.

• **Done in Half Hour**—The D-H processing takes place as soon as the heat of steel is tapped from an open hearth or electric arc melting furnace. Immediately upon completion of about half an hour of D-H processing, the steel is teemed into ingot molds.

Crucible has used its D-H unit on around 100 heats of carbon, alloy, and specialty steels since it was installed late last year. (See STEEL, Jan. 11, 1960, p. 78, and Dec. 19, 1960, p. 122.) The unit can treat the full capacity of any of the open hearth or electric melting furnaces at the Midland Works.

Production scale tests have covered a wide variety of grades. They include: AISI types 1020, 1040, 1046, 1085, 1095, 4130, 4142, 4320, 4340, 5140, 5160, 8620, 8640, 8645, 51100, 52100, and H-11 tool steel. No stainless grades have been evaluated, but they eventually will be.

• **Improves Any Steel**—Crucible is confident it can make at least some improvement in quality of any grade of steel produced in an open hearth or electric arc furnace.

Maximum alloy addition to date has exceeded 2 per cent with no associated problems. Two to three times that quantity appears practical if it is desirable for metallurgical purposes, Crucible says.

Checks show that the ladle chemistry for elements added in the D-H treatment unit is entirely uniform from the start to the end of the heat.

An incidental result is a slight reduction (around 0.002 per cent) of sulfur.

• **Contributes to Soundness**—Grain size is consistently fine and normal. Hardenability is normal as evaluated in terms of specific heat chemistry. Macroetch is good, with improvement in the center soundness of large blooms.

Another attribute is the absence of flake.

Magnaflux test results have been good, Crucible reports.

A high degree of microcleanliness is reflected by a low level of oxide types of nonmetallic inclusions (see accompanying illustration).

Nitrogen is not significantly reduced from steels initially low in it, but those higher in nitrogen lose one-fourth to one-third of it during D-H treatment. Oxygen reductions are substantial, ranging from 55 to 90 per cent. The greatest percentage of reduction occurs with heats initially high in oxygen, but removal is substantial even from heats fairly low in it. Hydrogen is also effectively removed.

• **Good Directional Properties**—The exclusion of impurities improves the directional properties of the steel.

The D-H unit, which gives Crucible a means of rapidly processing large lots of steel, was installed by Lectromelt Div., Pittsburgh, McGraw-Edison Co., under license by Dortmund-Horder Huttenunion, of Dortmund, West Germany.

While acknowledging that much remains to be done to obtain optimum results, Crucible is convinced that it has a highly versatile metallurgical production tool for use on many metalworking problems.

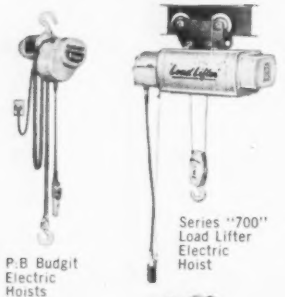
Lifting Made Easy

HOISTS AVAILABLE FOR EVERY LIFTING JOB

1✓ ELECTRIC HOISTS for frequent lifting with pace setting speed

2✓ AIR HOISTS to lift fast where atmosphere conditions are hazardous, corrosive, extremely hot, dirty or wet

3✓ CHAIN BLOCKS for easy lifting where the work cycle is moderate



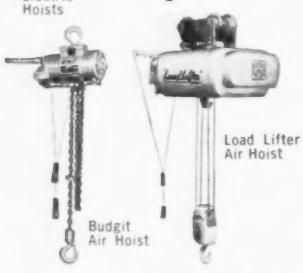
P:B Budgit Electric Hoists

Series "700" Load Lifter Electric Hoist

ELECTRIC HOISTS

P:B Budgit® Electric Hoists. 1/8 to 2 tons. Modern push-button hoists for regular service. Portable. Two fully enclosed automatic brakes. Spotting action is fast, accurate. 1/2-ton load can be lifted at 34 FPM. Hook suspension. Trolleys available. Standard models for intermittent service — AC, DC, and 12-volt battery types — have pull cord control.

Load Lifter® Electric Hoists. 1/2 to 15 tons. For heavy-duty and production line service. Safe 24-volts at the push button. Single and 2-speed control. A ton can be lifted at 60 FPM. Two automatic brakes. Types for lug or hook suspension; also with push, hand-geared or motor-driven trolley. Hi-hook model increases length of lift.



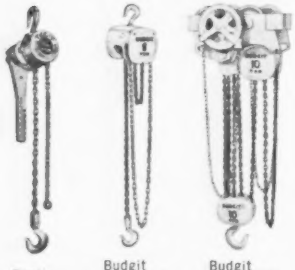
Budgit Air Hoist

Load Lifter Air Hoist

AIR HOISTS

Budgit® Air Hoists. 1/4, 1/2 and 1 ton. Compact, lightweight hoists for regular lifting service. Link and roller chain types. Explosion proof motor. Spark and corrosion resistant link chain models. Speeds infinitely variable to 75 FPM. Pull cord control. Safety hooks standard. Rigid mount type and push trolley available.

Load Lifter® Air Hoists. 1 to 15 tons. Wire rope type for heavy-duty service. Five cylinder motor for smooth operation at all speeds. Speed infinitely variable to 37 FPM. Pull cord control standard; throttle control available. Mechanical load brake adjusts itself. Lug, push trolley, and hand-geared trolley suspension.



Tugit

Budgit Aluminum Chain Block

Budgit Army Type Chain Block

CHAIN BLOCKS

Tugit® . . . the Lever-Operated Hoist. 3/4 to 3 tons. Light. Compact. Portable. Operates easily at any angle even in close quarters. Has countless uses in every industry. Spur-geared for highest efficiency. A 42-lb. pull on the handle lifts 2 tons. Spark and corrosion resistant models.

Budgit® Chain Blocks. 1/4 to 10 tons. For production or maintenance. Combine light, strong aluminum frame with spur-geared lifting and automatic load brake. 25 lb. pull on hand chain lifts 1/4 ton. Hook suspension standard. Trolleys available. Army-type Budgit has integral trolley that can be adjusted to fit several sizes of I-beams and permits high hook lift. Ask about spark and corrosion resistant models.

SOLVE YOUR LIFTING PROBLEMS. Call your nearby Shaw-Box Distributor for practical help in selecting the best type of overhead load handling equipment — hoist or crane — for each task. Or, write us for literature.

D

MANNING MAXWELL & MOORE INC. M&M TRADE MARK

OVERHEAD LOAD HANDLING EQUIPMENT

Products of

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In Canada: Manning, Maxwell & Moore of Canada, Ltd., Galt, Ontario.

Sheets, Strip . . .

Sheet & Strip Prices, Pages 168 & 169

Sheet buying is more active as requirements become more diversified. More hot and cold rolled tonnage is going into shipping containers, household appliances, office furniture, and shelving. Automotive requirements are quickening to some extent.

Coated sheets continue active, stimulated by housing and agricultural requirements, including grain storage bins. The auto industry is taking relatively more galvanized sheets than formerly.

Galvanized product makers are booked ahead eight to nine weeks. Hot rolled sheets are available within two to three weeks; cold rolled sheets, at around three to four weeks on an average. Low silicon electrical sheets are holding at about four weeks; high silicon, at three to four weeks. Enameling stock can be had in three weeks.

Shipments of sheet and strip to New England users in May will be the heaviest for any month so far this year. Some users are placing other than fill-in orders for the first time this year. Sales of galvanized material in heavier gages for highway drainage have improved substantially.

Army Quartermaster Depot, Richmond, Va., is closing on 217,000 steel drums, exterior to be enameled.

Tubular Goods . . .

Tubular Goods Prices, Page 171

Although May started slowly, producers of oil country goods hope to book and ship more tonnage this month than they did in April. Last month's results were disappointing. A large tubemaker and one of its smaller competitors saw their 20 per cent gain in March followed by a loss of the same proportion. Shipments fell back to the February level, reversing a steady uptrend that started last November.

Major oil companies can get fast service from downriver stocks of tubing and casing so they have little incentive to order ahead. But since their inventories are low, some companies are starting to place orders for third quarter shipment direct from the mills.

The number of rotary rigs in operation in the U. S. has increased for the sixth consecutive week,

Hughes Tool Co. reports. The U. S. now has 1775 operating rigs, an increase for the week of 29. Canada has 79 rigs, the same number as shown in the last previous survey.

Steel Bars . . .

Bar Prices, Page 167

Demand for hot rolled carbon bars is a shade more active than it was. Orders for shipment in the second quarter are nearly 10 per cent heavier in New England, for instance, than they were during the first three months.

Diversified orders and a mild upturn in consumption account for the increase; buying for inventory buildup continues restricted. But buying from major consumers of hot stock, including fastener manufacturers, railroads, and cold drawers is far from brisk.

The Springfield, Mass., Armory closes May 25 on 357 tons of bar stock; all but 68 tons is hot rolled, resulfurized, grade 8620H, 1-23/32 in. round cornered, gun quality.

Plates . . .

Plate Prices, Page 167

Despite some pickup in structural requirements and a fairly good demand from the chemical industry for specialties, plate demand as a whole still lags. Sheared and universal plates are quoted at 10 days to two weeks; alloys, four to five weeks.

Fabricating shops in New England have small backlogs and are estimating only slightly heavier tonnages. Forward buying is slow, although more consumers have worked stocks down to a low level. Buying is largely against new firm orders, but includes a relatively larger ratio of high tensile, low alloy grades than usual (weight saving is frequently a factor in design of finished plate structures).

Small tank business has improved seasonally, but most shops are filling demand from inventory of light gage steel. Paper and chemical industries are buying mostly for maintenance rather than for expansion.

First commercial rolling of nickel clad, steel plate by Phoenix Steel Corp. was completed recently at its Claymont, Del., plant. The company is completing an order which includes various items for a chemical

With this drag of pine and balsam,
With an arrow's speed and aim,
Junior takes his pigs to market
. . . Service has brought Kemco fame!

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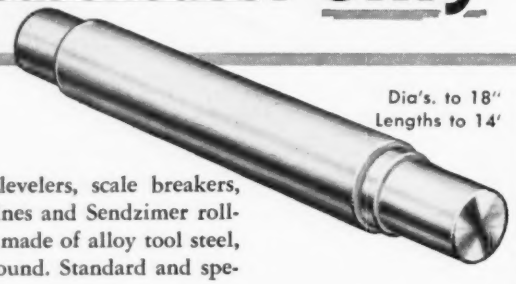
For STEEL MILLS

and warehouses *only*



Dia's. to 18"
Lengths to 14'

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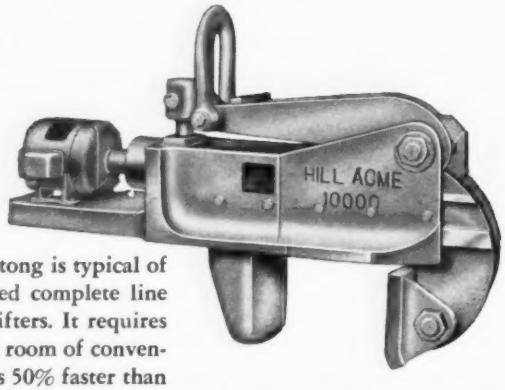
Custom made for levelers, scale breakers, straightening machines and Sendzimer rolling mills. Precision made of alloy tool steel, heat treated and ground. Standard and special types.

"CLEVELAND" METAL CUTTING KNIVES

The product of forty years of experience in manufacturing alloy grade, metal cutting knives of all types for shearing hot and cold metals.

"HILL ACME" MOTORIZED LIFTERS



This vertical coil tong is typical of the newly designed complete line of HILL ACME lifters. It requires only 1/3 the head room of conventional tongs and is 50% faster than mechanical types. Gives a constant grip ratio regardless of wall thickness and can be prepositioned to eliminate damage to the coil. Available up to 80,000 lbs. capacity. Contact us for "C" hooks, Rack Lifters, Billet, Sheet, Plate, Bar, Ingot and Ingot Mould Lifters.

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1201 West 65th Street • Cleveland 2, Ohio

MANUFACTURERS OF: "HILL" Grinding and Polishing Machines • "ACME" Forging Machines • "CANTON" Rotary and Alligator Shears • BAR-BILLET Shears MATERIAL HANDLING Equipment • "CLEVELAND" Knives and Shear Blades.

processing plant in the Northwest. The items include plates with 1/16 in. cladding which are 7/16 in. by 109 in. by 229 in.; a nickel clad head of 72 in. diameter; and other sizes of solid stainless steel heads and stainless clad and carbon steel heads and plates.

Distributors . . .

Prices, Page 172

Steel service centers are booking about the same volume of business on a day-to-day basis. Should this rate hold, May business should run a little heavier than in April due to the larger number of working days. Distributors have well rounded stocks of all products.

Demand for specialties in New England has increased more than for standard carbon products. In some instances, distributors have permitted specialty stocks to dwindle in recent months. Stainless is an exception and most distributors are able to meet broader demand for that grade.

The price situation in the Pacific Northwest is firmer than it was earlier in the year. Imports are negligible in that area, although elsewhere on the coast foreign steel is still making inroads on the market.

Wire . . .

Wire Prices, Pages 169 & 170

While users of industrial wire are placing more orders for May and June shipment, few are building inventory to normal levels. Bookings in the second half are expected to top those in the first half, but inquiries leave much conjecture as to how much tonnage will increase.

Mesh demand in the St. Louis area is picking up a little, though the most active season has not arrived. May shipments will run at a rate equivalent to about 60 per cent of the capacity of the district mill. (Mesh is used for reinforcing paving slabs.)

Signs of improved demand for manufacturers' wire are appearing in the Midwest. The spurt is a result of buying activity by the automotive industry, especially in high carbon wire. Shipments to that industry will have to be made within the next two months to get into this year's model cars.

Universal Wire Co., Stamford,

QUALITY RINGS TRUE

Snap rings are one of the most elementary of fasteners — yet are called upon to play vital roles in the assembly of thousands of products. This is why there can be no sacrifice of quality when you specify snap, bearing, lock or retainer rings for your products. For unless the rings you specify do their job well — literally hold your products together — the result can only be loss of customer satisfaction. Your best assurance of quality is the reputation of the company who supplies your rings. Eaton's Reliance Division handles every step in the fabrication of rings from the cold finishing of the spring-quality steel through the forming, heat treating and finishing. Every step is guarded by an exacting quality control program that leaves no stone unturned to assure that your specifications are held completely. In addition to custom rings, Reliance produces an extensive line of standard rings for most standard ring applications. Write for engineering specifications.

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Conn., a subsidiary of Bostitch Inc., Greenwich, R. I., is building a wire mill at Clinton, Conn., for the production of stapling and stitching wire.

Iron ore . . .

Iron Ore Prices, Page 173

Receipts of iron ore and ore agglomerates at iron and steel plants in the U. S. and Canada in the first quarter totaled 8,296,743 tons compared with 13,728,221 tons in the like period a year ago, reports the American Iron Ore Association, Cleveland.

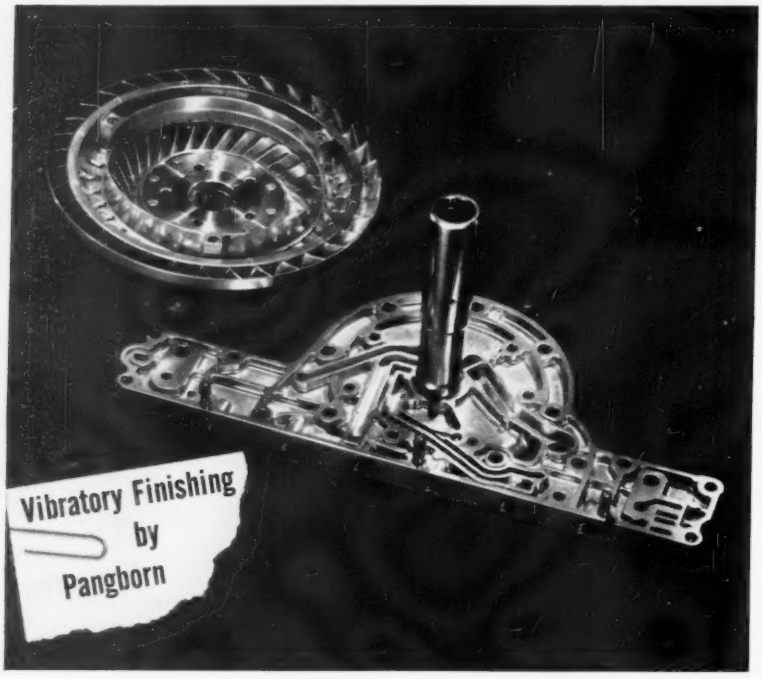
U. S. and Canadian consumption amounted to 20,773,997 tons in the first quarter compared with 36,725,-791 tons in the like 1960 period. Inventory as of Mar. 31 totaled 58,-097,691 tons compared with 36,-394,597 tons a year earlier.

What's believed to be the first cargo of iron ore ever to arrive at Buffalo on a self-unloader was brought in by the *Charles C. West* of the Rockport Transportation Co., Sheboygan, Mich. It carried 11,000 tons, consigned from Port Arthur, Ont.

Self-unloaders on the Great Lakes usually carry stone, sand, or coal. Veteran marine men at Buffalo say they know of only a few instances, largely experimental, where self-unloaders have taken on ore cargoes. Ore handling is difficult. It's hard to get the sticky, heavy ore to run from the hoppers to the conveyor belts for discharge to the dock.

Only 86 Great Lakes ore vessels (with a trip capacity of 1,188,825 tons) were in commission on May 15. That represents 40.76 per cent of the fleet (211) and 43.31 per cent of trip capacity (2,745,075 tons).

Bethlehem Transportation Corp. had none of its 12 vessels in commission; the Tomlinson fleet has none of its five vessels in commission. The largest fleet (Pittsburgh Steamship Co.) has 16 of its 52 vessels in commission.



Suddenly complex finishing has a simple solution!

The Pangborn Vibratory Finishing Machine has an unusually wide range of application. What would you like to descale, deburr, radius, finish or burnish?

Metal and metal alloy as well as many plastic and ceramic parts may be vibratory finished. This machine processes extremely small and delicate items with the same facility it handles large and heavy objects.

What's more, the Pangborn Vibratory Finishing Machine performs as much as 100 times faster than conventional equipment. Cuts costs? You bet!

All sizes of the machine come equipped with variable speeds and amplitudes plus new improved air-cushioned suspension. Optional air-cushioned floor mounts completely eliminate any transmission of vibration to the floor. Auxiliary equipment and the best in media and compounds are available for your every need. Send parts with exact finish specifications or finished specimen for sample processing in our laboratory to Mr. William E. Brandt at:

PANGBORN CORPORATION, 1600 Pangborn Blvd., Hagerstown, Md.; Pangborn Canada Ltd. 47 Shaft Rd., Toronto (Rexdale). Canada — *Manufacturers of Vibratory Finishing, Blast Cleaning, Dust Control Equipment — Rotoblast® Steel Shot and Grit®.*

Pangborn
OF HAGERSTOWN

Structural Shapes . . .

Structural Shape Prices, Page 167

Though comprised principally of small orders, buying of structural is increasing. In New England, buying of wide flanged shapes for bridges is more active, with the bulk of designs for stringer and wide flange. While there are few large sized bridge tonnages up for estimating, the number of projects is increasing.

There is a greater diversification of jobs in the structural market. Price competition among fabricating shops is keen. Led by schools, public construction work is holding up well; private building (commercial and industrial) continues slow. Delivery promises range from two to three months for the smaller and medium sized shops; three to four months for the larger shops.

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

275 tons, welded plate girder bridge on Highway 87 near Loveland, Colo., Colorado State Highway Department, to Burkhardt Steel Co., Denver.

100 tons or more, five, guyed antenna towers, U. S. Coast Guard, Washington, to Windturbine Co., West Chester, Pa., $370,394.

47 tons, addition and alterations, medical school, Harvard University, Cambridge, Mass., to West End Iron Works, Cambridge; George A. Fuller Co., Boston, general contractor.

STRUCTURAL STEEL PENDING

3550 tons, channels, Grade M, Type A, Military Industrial Supply, Navy, Philadelphia; bids May 26; also 67 tons wide flange, bids May 24.

1750 tons, state highway bridge, Passagassawaukeag river, Route U. S. 1, Project BU-026-2(1) contract 1, Belfast, Maine, Ellis C. Snodgrass Inc., Portland, Maine, low on gen-

eral contract; also 480 tons, concrete reinforcing bars, and 605 tons, steel piles.

900 tons, galvanized transmission towers; Italian fabricators reported low to Bonneville Power Administration, Portland, Oreg.

415 tons, Delaware State Basin Road Interchange; bids June 7.

373 tons, two, 3 span composite and noncomposite wide flange beam bridges and one, 4 span composite wide flange beam bridge, Williston-South Burlington, Vt. Project I-89-3(14), Contract 3; bids June 2, Montpelier, Vt.; also 210 tons, concrete reinforcing bars and 3600 linear feet steel piles.

325 tons, two, 3 span composite and one, 4 span composite wide flange beam bridges, Williston-South Burlington, Vt., project I-89-3(14), contract 2; bids June 23, Montpelier, Vt.; also 140 tons, concrete reinforcing bars and 2640 linear ft steel piles.

300 tons, also reinforcing, General Electric sales center, Seattle, $1.5 million project; general contract to George Teufel Co., Seattle.

300 tons, Riddle Memorial Hospital, Media, Pa.; new bids May 24.

245 tons, state bridgework, Union County, New Jersey, bids May 18; also, 107 tons of reinforcing bars.

223 tons, substation buildings, Missouri River Basin project, near Denison, Spencer, and Creston, Iowa; bids June 8.

220 tons, tee-sections, type A, grade M; bids May 24, Military Industrial Supply, Navy, Philadelphia.

REINFORCING BARS . . .

REINFORCING BARS PLACED

500 tons, water supply line, Aberdeen, Wash.; subcontract to United Concrete Pipe Corp., Auburn, Wash.

220 tons, Washington state highway span, Lewis County, to Northwest Steel Rolling Mills Inc., Seattle; Lee T. Dulin, Seattle, general contractor.

165 tons, Seneca Street ramp, Seattle; to Northwest Steel Rolling Mills Inc., Seattle; Willar Construction Co., Seattle, general contractor.

125 tons, Washington state highway paving, Grays Harbor County, to Northwest Steel Rolling Mills Inc., Seattle; Erickson Paving Co., Bellevue, Wash., general contractor.

56 tons, addition and alterations, medical school, Harvard University, Cambridge, Mass., to Bethlehem Steel Co., Bethlehem, Pa.; George A. Fuller Co., Boston, general contractor.

REINFORCING BARS PENDING

500 tons, Seattle University dormitory; Cawdrey & Vemo, Seattle, low $1,440,356.

230 tons, Idaho state highway spans, Bonneville and Jefferson Counties; Peter Kiewit Sons Co., Vancouver, Wash., low $1,588,104.

171 tons, state bridgework, Snyder-Union Counties, Pennsylvania; bids June 8.

Steel Ingot Production Makes Tenth Weekly Gain

STEELMAKING operations are at the highest level since a year ago and no reversal in the trend is likely for several weeks. STEEL estimates production for the week ended May 20 at 2,025,000 tons compared with 1,988,000 tons for the preceding week and 2,031,000 tons for the like 1960 week.

Improvement in steel during recent weeks has been due to a cessation of inventory liquidation by users and a beginning of an actual rise in consumption, says T. F. Patton, president, Republic Steel Corp., Cleveland.

"The recovery in general business activity," he says, "is turning out to be more vigorous than most people anticipated. The steel industry is benefiting from this development because the industries that are primarily responsible for the better general outlook—autos and capital goods—are major steel consumers."

He looks for some increase in shipments in the third quarter over those of the second quarter as the transition to inventory buildup in steel offsets some adverse seasonal factors. That will "set the stage for a sharp upward pattern in the fourth quarter, and in the first quarter of 1962."

• **Pittsburgh** — Production is gaining here. Charles G. Tournay, president, Weirton Steel Co., a division of National Steel Corp., says he expects the upturn to continue and gain strength with May shaping up as the best shipping month of 1961 to date and June promising to be better than May. The company is keeping an average of 12 of its 14 open hearth furnaces in production. Other producers in the

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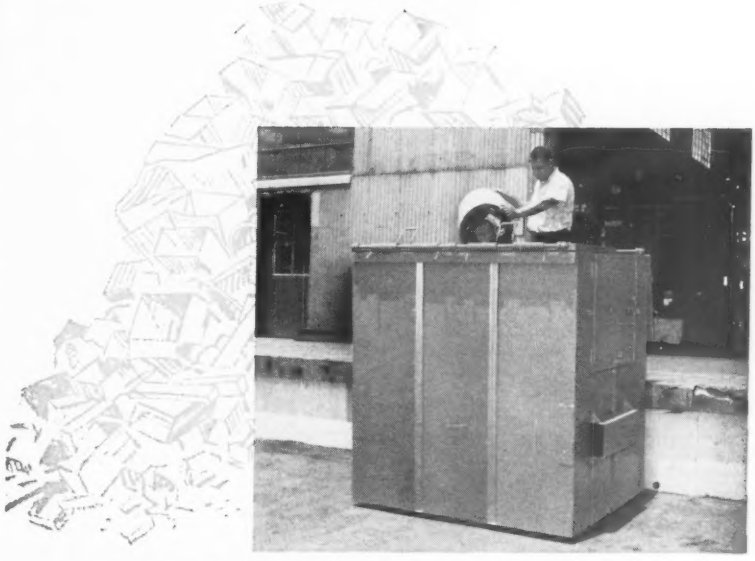

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district report a similar improvement in steel demand.

• **Youngstown** — Production rose about 6000 tons during the week ended May 20, or to about 51 per cent of 1960 capacity. U. S. Steel added one open hearth at its Ohio Steel Works. Sharon Steel Corp. started up a sixth open hearth at its Roemer Works at Farrell, Pa. An electric furnace at the plant is operating 20 turns a week out of a possible 21. The firm is operating at the highest level since last summer.

• **Buffalo** — Production is holding steady at about 70.8 per cent of 1960 capacity. Bethlehem Steel Co. is operating 24 of 35 open hearths; Republic Steel Corp., 4 of 9; and Wickwire Spencer Steel Div., Colorado Fuel & Iron Corp., 1 of 3.

• **Los Angeles**—The Western district operating rate hit 78 per cent of 1960 capacity during the week ended May 20, aided by a rebound of operations at Colorado Fuel & Iron Corp.'s plant at Pueblo, Colo., to 81 per cent of capacity. Kaiser Steel Corp. has started up a sixth open hearth furnace at its Fontana, Calif., plant. The furnace has a weekly capacity of about 3400 tons.

• **Birmingham**—Steel mills in the Southern district eased operations 1 point during the week ended May 20 to about 64 per cent of 1960 capacity.

Steel Ingot Production Rises 7 Per Cent in April

Steel ingot production increased to 7,585,000 net tons in April, the highest monthly total since May, 1960 (8,830,472 tons), and 7 per cent above the output of March, 1961 (7,086,389 tons), reports the American Iron & Steel Institute, New York.

April output was 29.9 per cent higher than it was in December (5,839,841 tons), the low point in 1960. The index of steelmaking was 95.0 in April (average output in 1957-59 = 100) compared with 85.9 in March.

Calculated weekly production came to 1,768,000 tons in April compared with 1,599,636 tons in March.

Steel production for the first four months of this year totaled 27,326,491 tons compared with 44,518,750 tons in the like period a year ago.

Steel Ingot Production — April, 1961

Period	Open Hearth (Net tons)	Bessemer (Net tons)	Basic Oxygen Process (Net tons)	Electric (b) (Net tons)	Totals (Net tons)	Index (a)
1961						
January	5,539,900	49,609	213,255	613,240	6,416,004	77.8
February	5,347,458	68,138	225,963	597,539	6,239,098	83.7
March*	6,068,244	75,694	281,698	660,753	7,086,389	85.9
1st Quarter*	16,955,602	193,441	720,916	1,871,532	19,741,491	82.4
April†	6,553,000	66,000	270,000	696,000	7,585,000	95.0
1960						
January	10,510,616	211,132	280,981	1,046,675	12,049,404	146.1
February	9,715,527	216,263	245,458	949,558	11,126,806	144.2
March	10,103,122	202,812	306,741	952,008	11,564,683	140.2
1st Quarter	30,329,265	630,207	833,180	2,948,241	34,740,893	143.4
April	8,603,306	105,336	302,763	766,452	9,777,857	122.5
May	7,844,140	73,010	309,505	603,817	8,830,472	107.0
June	6,441,594	80,344	314,766	568,169	7,404,873	92.7
2nd Quarter	22,889,040	258,690	927,034	1,938,438	26,013,202	107.4
1st Half	53,218,305	888,897	1,760,214	4,886,679	60,754,095	125.4
July	5,494,331	61,700	289,003	505,890	6,350,924	77.0
August	5,860,394	52,652	279,550	645,404	6,838,000	82.9
September	5,525,244	42,228	287,323	603,626	6,458,421	80.9
3rd Quarter	16,879,969	156,580	855,876	1,754,920	19,647,345	80.2
Nine Months	70,098,274	1,045,477	2,616,090	6,641,599	80,401,440	110.3
October	5,917,780	56,914	270,450	623,236	6,868,380	83.3
November	5,308,894	51,246	257,286	554,514	6,171,940	77.3
December	5,042,558	35,559	202,330	559,394	5,839,841	70.8
4th Quarter	16,269,232	143,719	730,066	1,737,144	18,880,161	77.1
2nd Half	33,149,201	300,299	1,585,942	3,492,064	38,527,506	78.7
Totals (1960)	86,367,506	1,189,196	3,346,156	8,378,743	99,281,601	101.9

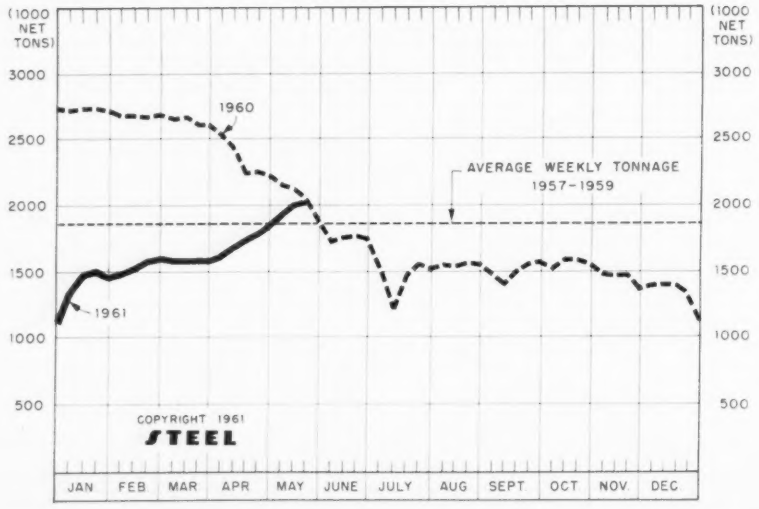
*Revised. †Preliminary. (a) Index based on average production 1957-59 as 100. (b) Includes crucible steel. Data from American Iron & Steel Institute.

STEEL INGOT PRODUCTION

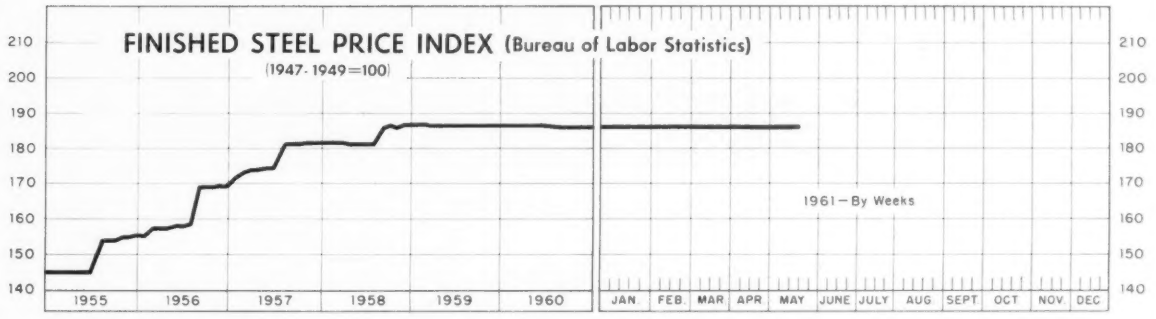
Weeks Ended	Net Tons	Change
May 20	2,025,000*	+ 1.9%
May 13	1,988,000	+ 2.3%
May 6	1,943,000	+ 4.6%
Totals to May 13		
1961	30,975,000	−35.4%
1960	47,979,000	

DISTRICTS	Week Ended —May 13— Tons‡	Index†	Week Ended May 6 Index†
Northeastern	280,556	105	107
Buffalo	116,826	120	112
Pittsburgh	371,265	92	92
Youngstown	163,182	96	89
Cleveland	114,818	124	116
Detroit	134,294	128	117
Chicago	396,521	106	106
Cincinnati	86,716	115	113
St. Louis	59,907	114	111
Southern	114,900	106	101
Western	148,480	127	124
Industry	1,988,000	106.7	104.3

*Estimated by STEEL.
†1957-59 (1,862,933 tons) = 100.
‡District tonnages are approximate and will not necessarily add to the national total.



Price Indexes and Composites



May 16, 1961	Week Ago	Month Ago	Apr. Index	Year Ago
186.1	186.1	186.1	186.1	186.8

AVERAGE PRICES OF STEEL (Bureau of Labor Statistics)

Week Ended May 16

Prices include mill base prices and typical extras and deductions. Units are 100 lb except where otherwise noted in parentheses. For complete description of the following products and extras and deductions applicable to them, write to STEEL.

Rails, Standard No. 1	$5.825
Rails, Light, 40 lb	7.292
Tie Plates	6.875
Axles, Railway	10.175
Wheels, Freight Car, 33 in. (per wheel)	62.000
Plates, Carbon	6.350
Structural Shapes	6.167
Bars, Tool Steel, Carbon (lb)	0.560
Bars, Tool Steel, Alloy, Oil Hardening Die (lb)	0.680
Bars, Tool Steel, H.R. Alloy, High Speed, W 6.75, Cr 4.5, V 2.1, Mo 5.5, C 0.060 (lb)	1.400
Bars, Tool Steel, H.R. Alloys, High Speed, W18 Cr 4, V 1 (lb)	1.895
Bars, H.R., Alloy	10.775
Bars, H.R., Stainless, 303 (lb)	0.543
Bars, H.R., Carbon	6.675
Bars, Reinforcing	6.335
Bars, C.F., Carbon	10.710
Bars, C.F., Alloy	14.125
Bars, C.F., Stainless, 302 (lb)	0.570
Sheets, H.R., Carbon	6.350
Sheets, C.R., Carbon	7.300
Sheets, Galvanized	8.775
Sheets, C.R., Stainless, 302 (lb)	0.658
Sheets, Electrical	12.625
Strip, C.R., Carbon	9.225
Strip, C.R., Stainless, 430 (lb)	0.480
Strip, H.R., Carbon	6.250
Pipe, Black, Buttweld (100 ft)	19.495
Pipe, Galv., Buttweld (100 ft)	23.098
Pipe Line (100 ft)	195.430
Casing, Oil Well, Carbon (100 ft)	201.080
Casing, Oil Well, Alloy (100 ft)	315.213
Tubes, Boiler (100 ft)	51.200
Tubing, Mechanical, Carbon (100 ft)	27.005
Tubing, Mechanical, Stainless, 304 (100 ft)	194.268
Tin plate, Hot-dipped, 1.25 lb (95 lb base box)	10.100
Tin Plate, Electrolytic, 0.25 lb (95 lb base box)	8.800
Black Plate, Canmaking Quality (95 lb base box)	7.900
Wire, Drawn, Carbon	10.575
Wire, Drawn, Stainless, 430 (lb)	0.665
Bale Ties (Bundles)	7.647
Nails, Wire, 8d Common	9.433
Wire, Barbed (80-rod spool)	8.372
Woven Wire Fence (20-rod roll)	20.910

STEEL's FINISHED STEEL PRICE INDEX

	May 17 1961	Week Ago	Month Ago	Year Ago	5 Yr Ago
Index (1935-39 avg=100)	247.82	247.82	247.82	247.82	210.45
Index in cents per lb	6.713	6.713	6.713	6.713	5.701

STEEL's ARITHMETICAL PRICE COMPOSITES

Finished Steel, NT	$149.96	$149.96	$149.96	$149.96	$128.98
No. 2 Fdry, Pig Iron, GT	66.49	66.49	66.49	66.49	60.27
Basic Pig Iron, GT	65.99	65.99	65.99	65.99	59.80
Malleable Pig Iron, GT	67.27	67.27	67.27	67.27	61.27
Steelmaking Scrap, GT	36.33	36.33	38.67	33.33	51.00

Comparison of Prices

Comparative prices by districts in cents per pound except as otherwise noted. Delivered prices based on nearest production point.

FINISHED STEEL	May 17 1961	Week Ago	Month Ago	Year Ago	5 Yr Ago
Bars, H.R., Pittsburgh	5.675	5.675	5.675	5.675	4.65
Bars, H.R., Chicago	5.675	5.675	5.675	5.675	4.65
Bars, H.R., deld., Philadelphia	5.98	5.98	5.98	5.975	4.93
Bars, C.R., Pittsburgh	7.65	7.65	7.65	7.65	6.25
Shapes, Std., Pittsburgh	5.50	5.50	5.50	5.50	4.60
Shapes, Std., Chicago	5.50	5.50	5.50	5.50	4.60
Shapes, deld., Philadelphia	5.745	5.745	5.745	5.77	5.00
Plates, Pittsburgh	5.30	5.30	5.30	5.30	4.50
Plates, Chicago	5.30	5.30	5.30	5.30	4.50
Plates, Coatesville, Pa.	5.30	5.30	5.30	5.30	4.80
Plates, Sparrows Point, Md.	5.30	5.30	5.30	5.30	4.50
Plates, Claymont, Del.	5.30	5.30	5.30	5.30	5.35
Sheets, H.R., Pittsburgh	5.10	5.10	5.10	5.10	4.325
Sheets, H.R., Chicago	5.10	5.10	5.10	5.10	4.325
Sheets, C.R., Pittsburgh	6.275	6.275	6.275	6.275	5.325
Sheets, C.R., Chicago	6.275	6.275	6.275	6.275	5.325
Sheets, C.R., Detroit	6.275	6.275	6.275	6.275	5.325-5.425
Sheets, Galv., Pittsburgh	6.875	6.875	6.875	6.875	5.85
Strip, H.R., Pittsburgh	5.10	5.10	5.10	5.10	4.325
Strip, H.R., Chicago	5.10	5.10	5.10	5.10	4.325
Strip, C.R., Pittsburgh	7.425	7.425	7.425	7.425	6.25
Strip, C.R., Chicago	7.425	7.425	7.425	7.425	6.25-6.35
Strip, C.R., Detroit	7.425	7.425	7.425	7.425	6.35
Wire, Basic, Pittsburgh	8.00	8.00	8.00	8.00	6.60
Nails, Wire, nonstock, Pitts.	8.95	8.95	8.95	8.95	7.60
Tin Plate (1.50 lb) box, Pitts.	$10.65	$10.65	$10.65	$10.65	$9.85

SEMIFINISHED STEEL					
Billets, forging, Pitts. (NT)	$99.50	$99.50	$99.50	$99.50	$84.50
Wire rods, 5/32-5/8" Pitts.	6.40	6.40	6.40	6.40	5.375

PIG IRON, Gross Ton	May 17 1961	Week Ago	Month Ago	Year Ago	5 Yr Ago
Bessemer, Pittsburgh	$67.00	$67.00	$67.00	$67.00	$61.00
Basic, Valley	66.00	66.00	66.00	66.00	60.00
Basic, deld., Philadelphia	70.18	70.18	70.18	70.41	63.76
No. 2 Fdry, NevilleIsland, Pa.	66.50	66.50	66.50	66.50	60.50
No. 2 Fdry, Chicago	66.50	66.50	66.50	66.50	60.50
No. 2 Fdry, deld., Phila.	70.68	70.68	70.68	70.91	64.26
No. 2 Fdry, Birmingham	62.50	62.50	62.50	62.50	55.00
No. 2 Fdry (Birm.), deld., Cin.	70.20	70.20	70.20	70.20	62.70
Malleable, Valley	66.50	66.50	66.50	66.50	60.50
Malleable, Chicago	66.50	66.50	66.50	66.50	60.50
Ferromanganese, net tons†	245.00	245.00	245.00	245.00	215.00

†74-76% Mn, Duquesne, Pa.

SCRAP, Gross Ton (Including broker's commission)					
No. 1 Heavy Melt, Pittsburgh	$34.50	$34.50	$36.50	$33.50	$49.50
No. 1 Heavy Melt, E. Pa.	39.00	39.00	41.00	35.00	54.00
No. 1 Heavy Melt, Chicago	35.50	35.50	38.50	31.50	49.50
No. 1 Heavy Melt, Valley	37.50	36.50	36.50	34.50	53.50
No. 1 Heavy Melt, Cleve.	34.50	33.50	33.50	31.50	49.50
No. 1 Heavy Melt, Buffalo	31.50	31.50	31.50	30.50	53.50
Rails, Rerolling, Chicago	57.50	57.50	59.50	52.50	72.50
No. 1 Cast, Chicago	41.50	41.50	43.50	42.50	52.50

COKE, Net Ton					
Beehive, Furn., Connisvl.	$15.00	$15.00	$15.00	$15.00	$14.125
Beehive, Fdry., Connisvl.	18.25	18.25	18.25	18.25	16.50
Oven, Fdry., Milwaukee	32.00	32.00	32.00	32.00	27.50

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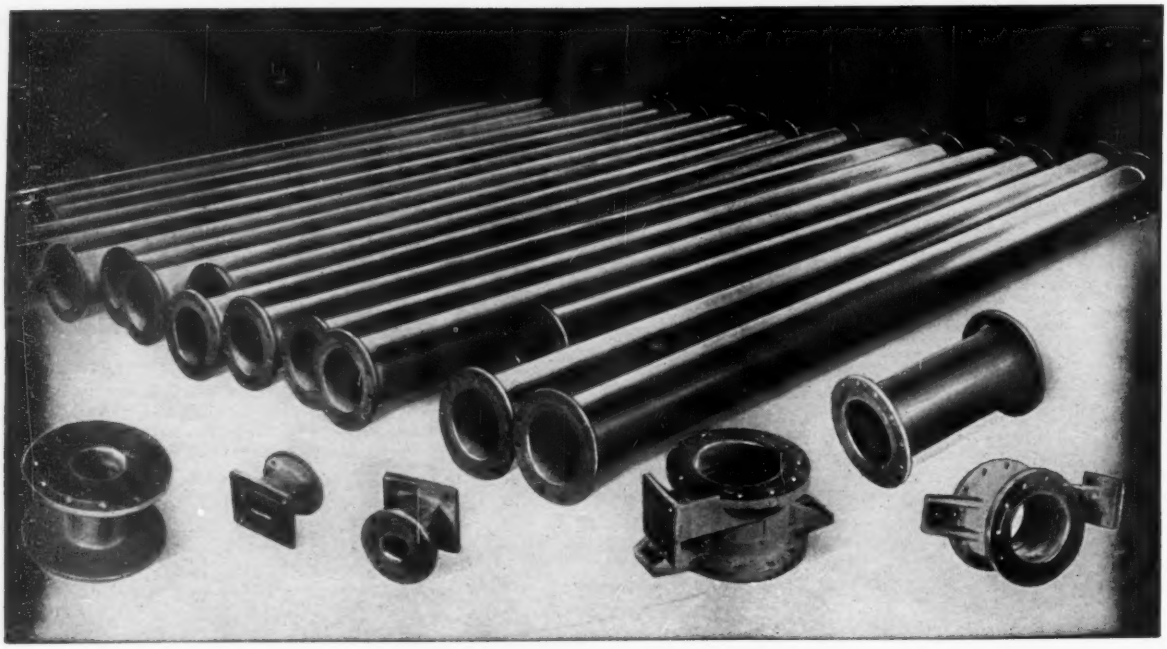

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Canada: Dominion Rubber Company, Ltd. Montreal, Quebec

Steel Prices

Mill prices as reported to STEEL, May 17, cents per pound except as otherwise noted. *Changes shown in italics.* Code number following mill point indicates producing company. Key to producers, page 168; footnotes, page 170.

SEMIFINISHED

INGOTS, Carbon Forging (NT)
Munhall,Pa. U5 ....$76.00

INGOT, Alloy (NT)
Detroit S41 ....$82.00
Economy,Pa. B14 ....82.00
Farrell,Pa. S3 ....82.00
Lowellville,O. S3 ....82.00
Midland,Pa. C18 ....82.00
Munhall,Pa. U5 ....82.00
Sharon,Pa. S3 ....82.00

BILLETS, BLOOMS & SLABS Carbon Rerolling (NT)
Bartonville,Ill. K4 ....$82.00
Bessemer,Pa. U5 ....80.00
Buffalo R2 ....80.00
Clairton,Pa. U5 ....80.00
Ensley,Ala. T2 ....80.00
Fairfield,Ala. T2 ....80.00
Fontana,Calif. K1 ....90.50
Gary,Ind. U5 ....80.00
Johnstown,Pa. B2 ....80.00
Lackawanna,N.Y. B2 ..80.00
Munhall,Pa. U5 ....80.00
Owensboro,Ky. G8 ....80.00
S.Chicago,Ill. R2, U5 ..80.00
S.Duquesne,Pa. U5 ....80.00
Sterling,Ill. N15 ....80.00
Youngstown R2 ....80.00

Carbon, Forging (NT)
Bessemer,Pa. U5 ....$99.50
Buffalo R2 ....99.50
Canton,O. R2 ....102.00
Clairton,Pa. U5 ....99.50
Conshohocken,Pa. A3 ..99.50
Ensley,Ala. T2 ....99.50
Fairfield,Ala. T2 ....99.50
Farrell,Pa. S3 ....99.50
Fontana,Calif. K1 ....109.00
Gary,Ind. U5 ....99.50
Geneva,Utah C11 ....99.50
Houston S5 ....104.50
Johnstown,Pa. B2 ....99.50
Lackawanna,N.Y. B2 ..99.50
LosAngeles B3 ....109.00
Midland,Pa. C18 ....99.50
Munhall,Pa. U5 ....99.50
Owensboro,Ky. C8 ....99.50
Seattle B3 ....109.00
Sharon,Pa. S3 ....99.50
S.Chicago R2, U5, W14 99.50
S.Duquesne,Pa. U5 ....99.50
S.SanFrancisco B3 ....109.00
Warren,O. C17 ....99.50

Alloy, Forging (NT)
Bethlehem,Pa. B2 ...$119.00
Bridgeport,Conn. C32 .119.00
Buffalo R2 ....119.00
Canton,O. R2, T7 ....119.00
Conshohocken,Pa. A3 .121.00
Detroit S41 ....119.00
Economy,Pa. B14 ....119.00
Farrell,Pa. S3 ....119.00
Fontana,Calif. K1 ....140.00
Gary,Ind. U5 ....119.00
Houston S5 ....124.00
Ind.Harbor,Ind. Y1 ..119.00
Johnstown,Pa. B2 ....119.00
Lackawanna,N.Y. B2..119.00
LosAngeles B3 ....139.00
Lowellville,O. S3 ....119.00
Massillon,O. R2 ....119.00
Midland,Pa. C18 ....119.00
Munhall,Pa. U5 ....119.00
Owensboro,Ky. G8 ....119.00
Seattle(6) B3 ....140.00
Sharon,Pa. S3 ....119.00
S.Chicago R2,U5,W14.119.00
S.Duquesne,Pa. U5 ..119.00
Struthers, O. Y1 ....119.00
Warren,O. C17 ....119.00

ROUNDS, SEAMLESS TUBE (NT)
Buffalo R2 ....$122.50
Canton,O. R2 ....125.00
Cleveland R2 ....122.50
Gary,Ind. U5 ....122.50
S.Chicago,Ill. R2,W14.122.50
S.Duquesne,Pa. U5 ..122.50
Warren,O. C17 ....122.50

SKELP
Aliquippa,Pa. J5 ....5.05
Benwood,W.Va. W10 ...5.05
Ind.Harbor,Ind. Y1 ...5.05
Munhall,Pa. U5 ....5.05
Pittsburgh J5 ....5.05
Warren,O. R2 ....5.05
Youngstown R2, U5 ...5.05

WIRE RODS
AlabamaCity,Ala. R2 ..6.40
Aliquippa,Pa. J5 ....6.40
Alton,Ill. L1 ....6.60
Bartonville,Ill. K4 ...6.50
Buffalo W12 ....6.40
Cleveland A7 ....6.40
Donora,Pa. A7 ....6.40
Fairfield,Ala. T2 ....6.40
Houston S5 ....6.65
IndianaHarbor,Ind. Y1 .6.40
Johnstown,Pa. B2 ....6.40
Joliet,Ill. A7 ....6.40
KansasCity,Mo. S5 ....6.65
Kokomo,Ind. C16 ....6.50
LosAngeles B3 ....7.20
Minnequa,Colo. C10 ...6.65
Monessen,Pa. P7 ....6.40
Pittsburg,Calif. C11 ...7.20
Portsmouth,O. P12 ....6.40
Roebling,N.J. R5 ....6.50
S.Chicago,Ill. R2, W14..6.40
SparrowsPoint,Md. B2 ..6.50
Sterling,Ill.(1) N15 ...6.40
Sterling,Ill. N15 ....6.50
Struthers,O. Y1 ....6.40
Worcester,Mass. A7 ...6.70

STRUCTURALS

Carbon Steel Std. Shapes
AlabamaCity,Ala. R2 ...5.50
Aliquippa,Pa. J5 ....5.50
Atlanta A11 ....5.70
Bessemer,Ala. T2 ....5.50
Bethlehem,Pa. B2 ....5.55
Birmingham C15 ....5.50
Clairton,Pa. U5 ....5.50
Fairfield,Ala. T2 ....5.50
Fontana,Calif. K1 ....6.30
Gary,Ind. U5 ....5.50
Geneva,Utah C11 ....5.50
Houston S5 ....5.60
Ind.Harbor,Ind. I-2, Y1..5.50
Johnstown,Pa. B2 ....5.55
Joliet,Ill. P22 ....5.50
KansasCity,Mo. S5 ....5.60
Lackawanna,N.Y. B2 ...5.55
LosAngeles B3 ....6.20
Minnequa,Colo. C10 ...5.80
Munhall,Pa. U5 ....5.50
Niles,Calif. P1 ....6.25
Phoenixville,Pa. P4 ....5.55
Portland,Oreg. O4 ....6.25
Seattle B3 ....6.25
S.Chicago,Ill. U5, W14 .5.50
S.SanFrancisco B3 ....6.15
Sterling,Ill. N15 ....5.50
Struthers,O. Y1 ....5.50
Torrance,Calif. C11 ...6.20
Weirton,W.Va. W6 ....5.50

Wide Flange
Bethlehem,Pa. B2 ....5.55
Clairton,Pa. U5 ....5.50
Fontana,Calif. K1 ....6.45
IndianaHarbor,Ind. I-2 ..5.50
Lackawanna,N.Y. B2 ..5.55
Munhall,Pa. U5 ....5.50
Phoenixville,Pa. P4 ....5.55
S.Chicago,Ill. U5 ....5.50
Sterling,Ill. N15 ....5.50
Weirton,W.Va. W6 ....5.50

Alloy Std. Shapes
Aliquippa,Pa. J5 ....6.80
Clairton,Pa. U5 ....6.80
Gary,Ind. U5 ....6.80
Houston S5 ....6.90
Munhall,Pa. U5 ....6.80
S.Chicago,Ill. U5, W14 ..6.80

H.S., L.A., Std. Shapes
Aliquippa,Pa. J5 ....8.05
Bessemer,Ala. T2 ....8.05
Bethlehem,Pa. B2 ....8.10
Clairton,Pa. U5 ....8.05
Fairfield,Ala. T2 ....8.05
Fontana,Calif. K1 ....8.85
Gary,Ind. U5 ....8.05
Geneva,Utah C11 ....8.05
Houston S5 ....8.15
Ind.Harbor,Ind. I-2, Y1 .8.05
Johnstown,Pa. B2 ....8.10
KansasCity,Mo. S5 ....8.15
Lackawanna,N.Y. B2 ...8.10
LosAngeles B3 ....8.75
Munhall,Pa. U5 ....8.05
Phoenixville,Pa. P4 ....8.10
Seattle B3 ....8.80
S.Chicago,Ill. U5, W14..8.05
S.SanFrancisco B3 ....8.70
Sterling,Ill. N15 ....7.75
Struthers,O. Y1 ....8.05

H.S., L.A., Wide Flange
Bethlehem,Pa. B2 ....8.10
Ind.Harbor,Ind. I-2 ...8.05
Lackawanna,N.Y. B2 ...8.10
Munhall,Pa. U5 ....8.05
S.Chicago,Ill. U5 ....8.05
Sterling,Ill. N15 ....7.75

PILING

BEARING PILES
Bethlehem,Pa. B2 ....5.55
Ind.Harbor,Ind. I-2 ....5.50
Lackawanna,N.Y. B2 ...5.55
Munhall,Pa. U5 ....5.50
S.Chicago,Ill. I-2, U5 ..5.50

STEEL SHEET PILING
Ind.Harbor,Ind. I-2 ....6.50
Lackawanna,N.Y. B2 ...6.50
Munhall,Pa. U5 ....6.50
S.Chicago,Ill. I-2, U5 ...6.50
Weirton,W.Va. W6 ....6.50

PLATES

PLATES, Carbon Steel
AlabamaCity,Ala. R2 ...5.30
Aliquippa,Pa. J5 ....5.30
Ashland,Ky.(15) A10 ...5.30
Atlanta A11 ....5.50
Bessemer,Ala. T2 ....5.30
Clairton,Pa. U5 ....5.30
Claymont,Del. P4 ....5.30
Cleveland J5, R2 ....5.30
Coatesville,Pa. L7 ....5.30
Conshohocken,Pa. A3 ...5.30
Ecorse,Mich. G5 ....5.30
Fairfield,Ala. T2 ....5.30
Farrell,Pa. S3 ....5.30
Fontana,Calif.(30) K1 ...6.10
Gary,Ind. U5 ....5.30
Geneva,Utah C11 ....5.30
GraniteCity,Ill. G4 ....5.40
Houston S5 ....5.40
Ind.Harbor,Ind. I-2, Y1 .5.30
Johnstown,Pa. B2 ....5.30
Lackawanna,N.Y. B2 ...5.30
Mansfield,O. E6 ....5.30
Minnequa,Colo. C10 ...6.15
Munhall,Pa. U5 ....5.30
Newport,Ky. A2 ....5.30
Pittsburgh J5 ....5.30
Riverdale,Ill. A1 ....5.30
Seattle B3 ....6.20
Sharon,Pa. S3 ....5.30
S.Chicago,Ill. U5, W14 ..5.30
SparrowsPoint,Md. B2 ..5.30
Sterling,Ill. N15 ....5.30
Steubenville,O. W10 ...5.30
Warren,O. R2 ....5.30
Youngstown U5, Y1 ....5.30
Youngstown(27) R2 ....5.30

PLATES, Carbon Abras. Resist.
Claymont,Del. P4 ....7.05
Fontana,Calif. K1 ....7.85
Geneva,Utah C11 ....7.05
Houston S5 ....7.15
Johnstown,Pa. B2 ....7.05
SparrowsPoint,Md. B2 ..7.05

PLATES, Wrought Iron
Economy,Pa. B14 ....14.10

PLATES, H.S., L.A.
Aliquippa,Pa. J5 ....7.95
Ashland,Ky. A10 ....7.95
Bessemer,Ala. T2 ....7.95
Clairton,Pa. U5 ....7.95
Claymont,Del. P4 ....7.95
Cleveland J5, R2 ....7.95
Coatesville,Pa. L7 ....7.95
Conshohocken,Pa. A3 ...7.95
Economy,Pa. B14 ....7.95
Ecorse,Mich. G5 ....7.95
Fairfield,Ala. T2 ....7.95
Farrell,Pa. S3 ....7.95
Fontana,Calif.(30) K1 ...8.75
Gary,Ind. U5 ....7.95
Geneva,Utah C11 ....7.95
Houston S5 ....8.05
Ind.Harbor,Ind. I-2, Y1.7.95
Johnstown,Pa. B2 ....7.95
Munhall,Pa. U5 ....7.95
Pittsburgh J5 ....7.95
Seattle B3 ....8.85
Sharon,Pa. S3 ....7.95
S.Chicago,Ill. U5, W14..7.95
SparrowsPoint,Md. B2 ..7.95
Sterling,Ill. N15 ....7.625
Warren,O. R2 ....7.95
Youngstown U5, Y1 ....7.95

PLATES, Alloy
Aliquippa,Pa. J5 ....7.50
Claymont,Del. P4 ....7.50
Coatesville,Pa. L7 ....7.50
Economy,Pa. B14 ....7.50
Farrell,Pa. S3 ....7.50
Fontana,Calif. K1 ....8.30
Gary,Ind. U5 ....7.50
Houston S5 ....7.60
Ind.Harbor,Ind. Y1 ....7.50
Johnstown,Pa. B2 ....7.50
Lowellville,O. S3 ....7.50
Munhall,Pa. U5 ....7.50
Newport,Ky. A2 ....7.50
Pittsburgh J5 ....7.50
Seattle B3 ....8.40
Sharon,Pa. S3 ....7.50
S.Chicago,Ill. U5, W14..7.50
SparrowsPoint,Md. B2 ..7.50
Youngstown Y1 ....7.50

FLOOR PLATES
Cleveland J5 ....6.375
Claymont,Del. P4 ....6.375
Conshohocken,Pa. A3 ...6.375
Ind.Harbor,Ind. I-2 ...6.375
Munhall,Pa. U5 ....6.375
Pittsburgh J5 ....6.375
S.Chicago,Ill. U5 ....6.375

PLATES, Ingot Iron
Ashland c.l.(15) A10 ...5.55
Ashland l.c.l.(15) A10 ..6.05
Cleveland c.l. R22 ....6.05
Warren,O. R2 ....6.05

BARS

BARS, Hot-Rolled Carbon (Merchant Quality)
Ala.City,Ala.(9) R2 ...5.675
Aliquippa,Pa.(9) J5 ...5.675
Alton,Ill. L1 ....5.875
Atlanta(9) A11 ....5.875
Bessemer,Ala.(9) T2 ..5.675
Birmingham(9) C15 ...5.675
Buffalo(9) R2 ....5.675
Canton,O.(23) R2 ....6.15
Clairton,Pa.(9) U5 ...5.675
Cleveland(9) R2 ....5.675
Ecorse,Mich.(9) G5 ...5.675
Emeryville,Calif. J7 ...6.425
Fairfield,Ala.(9) T2 ...5.675
Fairless,Pa.(9) U5 ...5.825
Fontana,Calif.(9) K1 ..6.375
Gary,Ind.(9) U5 ....5.675
Houston(9) S5 ....5.925
Ind.Harbor(9) I-2, Y1..5.675
Johnstown,Pa.(9) B2 ..5.675
Joliet,Ill. P2 ....5.675
KansasCity,Mo.(9) S5 ..5.925
Lackawanna(9) B2 ....5.675
LosAngeles(9) B3 ....6.375
Massillon,O.(23) R2 ....6.15
Midland,Pa.(23) C18 ...6.025
Milton,Pa. M18 ....5.825
Minnequa,Colo. C10 ...6.125
Niles,Calif. P1 ....6.375
Owensboro,Ky.(9) G8 ...6.025
Pittsburg,Calif.(9) C11..6.375
Pittsburgh(9) J5 ....5.675
Portland,Oreg. O4 ....6.425
Riverdale,Ill.(9) A1 ...5.675
Seattle(9) A24,B3,N15 .6.425
S.Ch'c'go(9)R2,U5,W14 5.675
S.Duquesne,Pa.(9) U5 ..5.675
S.SanFran.,Calif.(9) B3 6.425
Sterling,Ill.(1)(9) N15 ..5.675
Sterling,Ill.(9) N15 ....5.775
Struthers,O.(9) Y1 ....5.675
Tonawanda,N.Y. B12 ...5.675
Torrance,Calif.(9) C11 .6.375
Warren,O. C17 ....6.025
Youngstown(9) R2, U5..5.675

BARS, Hot-Rolled Alloy
Aliquippa,Pa. J5 ....6.725
Bethlehem,Pa. B2 ....6.725
Bridgeport,Conn. C32 ...6.80
Buffalo R2 ....6.725
Canton,O. R2, T7 ....6.725
Clairton,Pa. U5 ....6.725
Detroit S41 ....6.725
Economy,Pa. B14 ....6.725
Ecorse,Mich. G5 ....6.725
Farrell,Pa. S3 ....6.725
Fontana,Calif. K1 ....7.775
Gary,Ind. U5 ....6.725
Houston S5 ....6.975
Ind.Harbor,Ind. I-2, Y1.6.725
Johnstown,Pa. B2 ....6.725
KansasCity,Mo. S5 ....6.975
Lackawanna,N.Y. B2 ..6.725
LosAngeles B3 ....7.775
Lowellville,O. S3 ....6.725
Massillon,O. R2 ....6.725
Midland,Pa. C18 ....6.725
Owensboro,Ky. G8 ....6.725
Pittsburgh J5 ....6.725
Seattle(6) B3 ....7.825
Sharon,Pa. S3 ....6.725
S.Chicago R2, U5, W14.6.725
S.Duquesne,Pa. U5 ....6.725
Struthers,O. Y1 ....6.725
Warren,O. C17 ....6.725
Youngstown U5 ....6.725

BARS & SMALL SHAPES, H.R. High-Strength, Low-Alloy
Aliquippa,Pa. J5 ....8.30
Bessemer,Ala. T2 ....8.30
Bethlehem,Pa. B2 ....8.30
Clairton,Pa. U5 ....8.30
Cleveland R2 ....8.30
Ecorse,Mich. G5 ....8.30
Fairfield,Ala. T2 ....8.30
Fontana,Calif. K1 ....9.00
Gary,Ind. U5 ....8.30
Houston S5 ....8.55
Ind.Harbor,Ind. Y1 ....8.30
Johnstown,Pa. B2 ....8.30
KansasCity,Mo. S5 ....8.55
Lackawanna,N.Y. B2 ..8.30
LosAngeles B3 ....9.00
Pittsburgh J5 ....8.30
Seattle B3 ....9.05
S.Chicago,Ill. R2, W14..8.30
S.Duquesne,Pa. U5 ....8.30
S.SanFrancisco B3 ....9.05
Sterling,Ill. N15 ....7.925
Struthers,O. Y1 ....8.30
Youngstown U5 ....8.30

BAR SIZE ANGLES; H.R. Carbon
Bethlehem,Pa.(9) B2 ..5.825
Houston(9) S5 ....5.925
KansasCity,Mo.(9) S5 ..5.925
Lackawanna(9) B2 ....5.675
Sterling,Ill. N15 ....5.775
Sterling,Ill.(1) N15 ....5.675
Tonawanda,N.Y. B12 ..5.675

BAR SIZE ANGLES; S. SHAPES
Aliquippa,Pa. J5 ....5.675
Atlanta A11 ....5.875
Joliet,Ill. P22 ....5.675
Minnequa,Colo. C10 ...6.125
Niles,Calif. P1 ....6.375
Pittsburgh J5 ....5.675
Portland,Oreg. O4 ....6.425
SanFrancisco S7 ....6.52
Seattle B3 ....6.425

BAR SIZE ANGLES; S. SHAPES Wrought Iron
Economy,Pa. B14 ....16.45

BAR SHAPES, Hot-Rolled Alloy
Aliquippa,Pa. J5 ....6.80
Clairton,Pa. U5 ....6.80
Gary,Ind. U5 ....6.80
Houston S5 ....7.05
KansasCity,Mo. S5 ....7.05
Pittsburgh J5 ....6.80
Youngstown U5 ....6.80

BARS, C.F. Leaded (Including leaded extra) Carbon
LosAngeles P2, S30 ...11.75*

Alloy
Ambridge,Pa. W18 ...10.175
BeaverFalls,Pa. M12 ..10.175
Camden,N.J. P13 ....10.35
Chicago W18 ....10.175
Elyria,O. W8 ....10.175
Monaca,Pa. S17 ....10.175
Newark,N.J. W18 ....10.35
SpringCity,Pa. K3 ....10.35

*Grade A; add 0.5c for Grade B.

BARS, Cold-Finished Carbon
Ambridge,Pa. W18 ....7.65
BeaverFalls,Pa. M12,R2.7.65
Birmingham C15 ....7.70
Buffalo B5 ....7.65
Camden,N.J. P13 ....8.10
Carnegie,Pa. C12 ....7.65
Chicago W18 ....7.65
Cleveland A7, C20 ....7.65
Detroit B5, H5, P17 ...7.85
Detroit S41 ....7.65
Donora,Pa. A7 ....7.65
Elyria,O. W8 ....7.65
FranklinPark,Ill. N5 ...7.65
Gary,Ind. R2 ....7.65
GreenBay,Wis. F7 ....7.65
Hammond,Ind. J5, L2 ..7.65
Hartford,Conn. R2 ....8.15
Harvey,Ill. B5 ....7.65
LosAngeles(49) S30 ....9.10
LosAngeles(49) P2, R2..9.10
Mansfield,Mass. B5 ....8.20
Massillon,O. R2 RS 7.65
Midland,Pa. C18 ....7.65
Monaca,Pa. S17 ....7.65
Newark,N.J. W18 ....8.10
NewCastle,Pa.(17) B4 ..7.65
Pittsburgh J5 ....7.65
Plymouth,Mich. P5 ....7.90
Putnam,Conn. W18 ....8.20
Readville,Mass. C14 ....8.20
Seattle(49) S30 ....9.10
S.Chicago,Ill. W14 ....7.65
SpringCity,Pa. K3 ....8.10
Struthers,O. Y1 ....7.65
Warren,O. C17 ....7.65
Waukegan,Ill. A7 ....7.65
Willimantic,Conn. J5 ...8.15
Youngstown F3, Y1 ....7.65

BARS, Cold-Finished Alloy (Turned and Ground)
Cumberland,Md.(5) C19 .6.55

BARS, Cold-Finished Alloy
Ambridge,Pa. W18 ....9.025
BeaverFalls,Pa. M12,R2 9.025
Bethlehem,Pa. B2 ....9.025
Bridgeport,Conn. C32 ..9.175
Buffalo B5 ....9.025
Camden,N.J. P13 ....9.20
Canton,O. T7 ....9.025
Carnegie,Pa. C12 ....9.025
Chicago W18 ....9.025
Cleveland A7, C20 ....9.25
Detroit B5, P17 ....9.225
Detroit H5, S41 ....9.025
Donora,Pa. A7 ....9.025
Elyria,O. W8 ....9.025
FranklinPark,Ill. N5 ..9.025
Gary,Ind. R2 ....9.025
GreenBay,Wis. F7 ....9.025
Hammond,Ind. J5, L2 ..9.025
Hartford,Conn. R2 ....9.325
Harvey,Ill. B5 ....9.025
Lackawanna,N.Y. B3 ..9.025
LosAngeles P2, S30 ...11.00
Mansfield,Mass. B5 ....9.325
Massillon,O. R2, R8 ....9.025
Midland,Pa. C18 ....9.025
Monaca,Pa. S17 ....9.025
Newark,N.J. W18 ....9.20
Plymouth,Mich. P5 ....9.225

S.Chicago,Ill. W14 ....9.025
SpringCity,Pa. K3 .....9.20
Struthers,O. Y1 .....9.025
Warren,O. C17 .....9.025
Waukegan,Ill. A7 ....9.025
Willimantic,Conn. J5 ..9.325
Worcester,Mass. A7 ...9.325
Youngstown F3, Y1 ...9.025

BARS, Reinforcing, Billet (To Fabricators)

AlabamaCity,Ala. R2 ..5.675
Atlanta A11 .....5.00
Birmingham C15 .....5.25
Buffalo R2 .....5.675
Cleveland R2 .....5.675
Ecorse,Mich. G5 .....5.675
Emeryville,Calif. J7 ..6.425
Fairfield,Ala. T2 .....5.675
Fairless,Pa. U5 .....5.825
Fontana,Calif. K1 ....6.375
Ft.Worth,Tex.(26) T4 ..5.50
Gary,Ind. U5 .....5.675
Houston S5 .....5.675
Ind.Harbor,Ind. I-2, Y1.5.675
Johnstown,Pa. B2 .....5.675
Joliet,Ill. P22 .....5.675
KansasCity,Mo. S5 ....5.675
Kokomo,Ind. C16 .....5.775
Lackawanna,N.Y. B2...5.675
LosAngeles B3 .....6.375
Madison,Ill. L1 .....5.875
Milton,Pa. M18 .....5.825
Minnequa,Colo. C10 ...6.125
Niles,Calif. P1 .....6.375
Pittsburg,Calif. C11 ..6.375
Pittsburgh J5 .....5.675
Portland,Oreg. O4 ....6.425
SandSprings,Okla. S5 ..5.675
Seattle A24, B3, N14 ..6.425
S.Chicago,Ill. R2, W14.5.675
S.Duquesne,Pa. U5 ....5.675
S.SanFrancisco B3 ....6.425
SparrowsPoint,Md. B2 .5.675
Steelton,Pa. B2 .....5.675
Sterling,Ill. (1) N15 ..5.675
Sterling,Ill. N15 .....5.775
Struthers,O. Y1 .....5.675
Tonawanda,N.Y. B12 ....6.10
Torrance,Calif. C11 ...6.375
Youngstown R2, U5 ...5.675

BARS, Reinforcing, Billet (Fabricated: to Consumers)

Baltimore B2 .....7.42
Boston B2, U8 .....8.15
Chicago U8 .....7.41
Cleveland U8 .....7.39
Johnstown,Pa. B2 .....7.33
Lackawanna,N.Y. B2 ..7.35
Marion,O. P11 .....6.70
Newark,N.J. U8 .....7.80
Philadelphia U8 .....7.63
Pittsburgh J5, U8 .....7.35
SandSprings,Okla. S5 ..7.35
Seattle A24, B3, N14 ..7.95
SparrowsPoint,Md. B2 ..7.33
St.Paul U8 .....8.17
Williamsport,Pa. S19 ..7.25

BARS, Wrought Iron

Economy,Pa.(S.R.)B14 15.10
Economy,Pa.(D.R)B14 19.30
Econ.(DirectRolled)B14 13.55
Economy(Staybolt)B14 19.80
McK.Rks.(S.R.) L5 ...14.50
McK.Rks.(D.R.) L5 ...19.80
McK.Rks.(Staybolt)L5 .20.95

BARS, Rail Steel

ChicagoHts.(3) C2, I-2 5.575
ChicagoHts.(4) (44) I-2.5.675
ChicagoHts.(4) C2 ....5.675
Franklin,Pa.(3) F5 ....5.575
Franklin,Pa.(4) F5 ....5.675
JerseyShore,Pa.(3) J8 ..5.55
Marion,O.(3) P11 ....5.575
Tonawanda(3) B12 ....5.575
Tonawanda(4) B12 .....6.10

SHEETS

SHEETS, Hot-Rolled Steel (18 Gage and Heavier)

AlabamaCity,Ala. R2 ..5.10
Allenport,Pa. P7 .....5.10
Aliquippa,Pa. J5 .....5.10
Ashland,Ky.(8) A10 ....5.10
Cleveland J5, R2 .....5.10
Conshohocken,Pa. A3 ..5.15
Detroit(8) M1 .....5.10
Ecorse,Mich. G5 .....5.10
Fairfield,Ala. T2 .....5.10
Fairless,Pa. U5 .....5.15
Farrell,Pa. S3 .....5.10
Fontana,Calif. K1 ....5.825
Gary,Ind. U5 .....5.10
Geneva,Utah C11 .....5.20
GraniteCity,Ill.(8) G4 ..5.20
Ind.Harbor,Ind. I-2, Y1.5.10
Irvin,Pa. U5 .....5.10
Lackawanna,N.Y. B2 ..5.10
Mansfield,O. E6 .....5.10
Munhall,Pa. U5 .....5.10
Newport,Ky. A2 .....5.10
Niles,O. M21, S3 .....5.10
Pittsburg,Calif. C11 ....5.80
Pittsburgh J5 .....5.10
Portsmouth,O. P12 ....5.10
Riverdale,Ill. A1 .....5.10
Sharon,Pa. S3 .....5.10
S.Chicago,Ill. U5, W14..5.10
SparrowsPoint,Md. B2 .5.10
Steubenville,O. W10 ....5.10
Warren,O. R2 .....5.10
Weirton,W.Va. W6 ....5.10
Youngstown U5, Y1 ....5.10

SHEETS, H.R. (19 Ga. & Lighter)

Niles,O. M21, S3 .....6.275

SHEETS, H. R. Alloy

Gary,Ind. U5 .....8.40
Ind.Harbor,Ind. Y1 ....8.40
Irvin,Pa. U5 .....8.40
Munhall,Pa. U5 .....8.40
Newport,Ky. A2 .....8.40
Youngstown U5, Y1 ....8.40

SHEETS, H.R. (14 Ga. & Heavier) High-Strength, Low-Alloy

Aliquippa,Pa. J5 .....7.525
Ashland,Ky. A10 .....7.525
Cleveland J5, R2 .....7.525
Conshohocken,Pa. A3 ..7.575
Ecorse,Mich. G5 .....7.525
Fairfield,Ala. T2 .....7.525
Fairless,Pa. U5 .....7.575
Farrell,Pa. S3 .....7.525
Fontana,Calif. K1 .....8.25
Gary,Ind. U5 .....7.525
Ind.Harbor,Ind. I-2, Y1 7.525
Irvin,Pa. U5 .....7.525
Lackawanna(35) B2 ..7.525
Munhall,Pa. U5 .....7.525
Niles,O. S3 .....7.525
Pittsburgh J5 .....7.525
S.Chicago,Ill. U5, W14.7.525
Sharon,Pa. S3 .....7.525
SparrowsPoint(36) B2..7.525
Warren,O. R2 .....7.525
Weirton,W.Va. W6 ....7.525
Youngstown U5, Y1 ...7.525

SHEETS, Hot-Rolled Ingot Iron (18 Gage and Heavier)

Ashland,Ky.(8) A10 ...5.35
Cleveland R2 .....5.875
Warren,O. R2 .....5.875

SHEETS, Cold-Rolled Ingot Iron

Cleveland R2 .....7.05
Middletown,O. A10 ....6.775
Warren,O. R2 .....7.05

SHEETS, Cold-Rolled Steel (Commercial Quality)

AlabamaCity,Ala. R2 ..6.275
Aliquippa,Pa. J5 .....6.275
Allenport,Pa. P7 .....6.275
Cleveland J5, R2 .....6.275
Conshohocken,Pa. A3 ..6.325
Detroit M1 .....6.275
Ecorse,Mich. G5 .....6.275
Fairfield,Ala. T2 .....6.275
Fairless,Pa. U5 .....6.325
Follansbee,W.Va. F4 ..6.275
Fontana,Calif. K1 .....7.40
Gary,Ind. U5 .....6.275
GraniteCity,Ill. G4 ....6.375
Ind.Harbor,Ind. I-2, Y1 6.275
Irvin,Pa. U5 .....6.275
Lackawanna,N.Y. B2 ..6.275
Mansfield,O. E6 .....6.275
Middletown,O. A10 ....6.275
Newport,Ky. A2 .....6.275
Pittsburgh J5 .....6.275
Portsmouth,O. P12 ....6.275
SparrowsPoint,Md. B2..6.275
Steubenville,O. W10 ...6.275
Warren,O. R2 .....6.275
Weirton,W.Va. W6 ....6.275
Youngstown Y1 .....6.275

SHEETS, Cold-Rolled, High-Strength, Low-Alloy

Aliquippa,Pa. J5 .....9.275
Cleveland J5, R2 .....9.275
Ecorse,Mich. G5 .....9.275
Fairless,Pa. U5 .....9.325
Fontana,Calif. K1 ....10.40
Gary,Ind. U5 .....9.275
Ind.Harbor,Ind. I-2, Y1 9.275
Lackawanna(38) B2 ..9.275
Pittsburgh J5 .....9.275
SparrowsPoint(33) B2..9.275
Warren,O. R2 .....9.275
Weirton,W.Va. W6 ....9.275
Youngstown Y1 .....9.275

SHEETS, Culvert	Cu Steel	Cu Fe
Ala.City,Ala. R2	7.125	....
Ashland,Ky. A10	7.225	7.475
Canton,O. R2	7.125	....
Fairfield,Ala. T2	7.125	7.375
Gary,Ind. U5	7.125	7.375
GraniteCity,Ill.G4	7.325	....
Ind.Harbor I-2	7.225	7.425
Irvin,Pa. U5	7.125	7.375
Kokomo,Ind. C16	7.325	....
MartinsFry. W10	7.125	7.375
Pitts.,Calif. C11	7.875	....
Pittsburgh J5	7.125	....
SparowsPt. B2	7.225	....
Weirton W6	7.125	....

SHEETS, Culvert—Pure Iron

Ind.Harbor,Ind. I-2 ....7.475

SHEETS, ENAMELING

Ashland,Ky. A10 .....6.775
Cleveland R2 .....6.775
Fairfield,Ala. T2 .....6.775
Gary,Ind. U5 .....6.775
Ind.Harbor,Ind. I-2, Y1 6.775
Irvin,Pa. U5 .....6.775
Middletown,O. A10 ....6.775
Niles,O. M21, S3 .....6.775
SparrowsPoint,Md. B2..6.775
Youngstown Y1 .....6.775

BLUED STOCK, 29 Gage

Dover,O. E6 .....8.70
Ind.Harbor,Ind. I-2 ....8.70
Mansfield,O. E6 .....8.70
Warren,O. R2 .....8.70
Yorkville,O. W10 .....8.70

SHEETS, Long Terne, Steel

Follansbee,W.Va. W10 .7.225
Gary,Ind. U5 .....7.225
Mansfield,O. E6 .....7.225
Middletown,O. A10 ....7.225
Niles,O. M21, S3 .....7.225
Warren,O. R2 .....7.225

SHEETS, Long Terne, Ingot Iron

Middletown,O. A10 ....7.625

SHEETS, Aluminum Coated

Butler,Pa. A10 (type 1) 9.525
Butler,Pa. A10 (type 2) 9.625
Irvin,Pa. U5 (type 1) ..9.525

SHEETS, Well Casing

Fontana,Calif. K1 ....7.325
Geneva,Utah C11 .....6.80

SHEETS, Galvanized High-Strength, Low-Alloy

Irvin,Pa. U5 .....10.125
Pittsburgh J5 .....10.125
SparrowsPt.(39) B2 ..10.025

SHEETS, Galvannealed Steel

Canton,O. R2 .....7.175
Irvin,Pa. U5 .....7.175

SHEETS, Galvanized Ingot Iron (Hot-Dipped Continuous)

Ashland,Ky. A10 .....7.125
Middletown,O. A10 ....7.125

SHEETS, Electrogalvanized

Canfield,O. C3 .....7.50
Cleveland (28) R2 ....7.65
Niles,O. (28) R2 .....7.65
Weirton,W.Va. W6 .....7.50

SHEETS, Galvanized Steel Hot-Dipped§

AlabamaCity,Ala. R2..6.875‡
Ashland,Ky. A10 ....6.875‡
Canton,O. R2 .....6.875‡
Dover,O. E6 .....6.875†
Fairfield,Ala. T2 ....6.875†
Gary,Ind. U5 .....6.875†
GraniteCity,Ill. G4 ...6.975*
Ind.Harbor,Ind. I-2 ..6.875†
Irvin,Pa. U5 .....6.875†
Kokomo,Ind. C16 ....6.975‡
MartinsFerry,O. W10..6.875*
Middletown,O. A10 ..6.875†
Pittsburg,Calif. C11 ...7.625*
Pittsburg J5 .....6.875†
SparrowsPt.,Md. B2 ..6.875†
Warren,O. R2 .....6.875†
Weirton,W.Va. W6 ..6.875*

*Continuous and noncontinuous. †Continuous. ‡Noncontinuous. §For minimum spangled add 0.15c.

Key to Producers

A1 Acme Steel Co.
A2 Acme-Newport Steel Co.
A3 Alan Wood Steel Co.
A4 Allegheny Ludlum Steel
A5 Alloy Metal Wire Div., H. K. Porter Co. Inc.
A6 American Shim Steel Co.
A7 American Steel & Wire Div., U. S. Steel Corp.
A8 Anchor Drawn Steel Co.
A9 Angell Nail & Chaplet
A10 Armco Steel Corp.
A11 Atlantic Steel Co.
A24 Alaska Steel Mills Inc.
A25 Algoma Steel Corp. Ltd.

B1 Babcock & Wilcox
B2 Bethlehem Steel Co.
B3 Bethlehem Steel Co., Pacific Coast Div.
B4 Blair Strip Steel Co.
B5 Bliss & Laughlin Inc.
B8 Braeburn Alloy Steel
B9 Brainard Steel Div., Sharon Steel Corp.
B10 E. & G. Brooke, Wickwire Spencer Steel Div., Colo. Fuel & Iron
B12 Buffalo Steel Corp.
B14 A. M. Byers Co.
B15 J. Bishop & Co.

C1 Calstrip Steel Corp.
C2 Calumet Steel Div., Borg-Warner Corp.
C3 Canfield Steel Co.
C4 Carpenter Steel Co.
C9 Colonial Steel Co.
C10 Colorado Fuel & Iron
C11 Columbia-Geneva Steel
C12 Columbia Steel & Shaft.
C13 Columbia Tool Steel Co.
C14 Compressed Steel Shaft.
C15 Connors Steel Div., H. K. Porter Co., Inc.
C16 Continental Steel Corp.
C17 Copperweld Steel Co.
C18 Crucible Steel Co.
C19 Cumberland Steel Co.
C20 Cuyahoga Steel & Wire
C23 Charter Wire Inc.
C24 G. O. Carlson Inc.
C32 Carpenter Steel of N.Eng.

D2 Detroit Steel Corp.
D4 Disston Div., H. K. Porter Co. Inc.
D6 Driver-Harris Co.
D7 Dickson Weatherproof Nail Co.
D8 Damascus Tube Co.
D9 Wilbur B. Driver Co.

E1 Eastern Gas&Fuel Assoc.
E2 Eastern Stainless Steel
E6 Empire-Reeves Steel
E10 Enamel Prod. & Plating

F2 Firth Sterling Inc.
F3 Fitzsimmons Steel Co.
F4 Follansbee Steel Corp.
F5 Franklin Steel Div., Borg-Warner Corp.
F6 Fretz-Moon Tube Co.
F7 Ft. Howard Steel & Wire
F8 Ft. Wayne Metals Inc.

G4 Granite City Steel Co.
G5 Great Lakes Steel Corp.
G6 Greer Steel Co.
G8 Green River Steel Corp.

H1 Hanna Furnace Corp.
H5 Hercules Drawn Steel
H7 Helical Tube Co.

I-1 Igoe Bros. Inc.
I-2 Inland Steel Co.
I-3 Interlake Iron Corp.
I-4 Ingersoll Steel Div., Borg-Warner Corp.
I-6 Ivins Steel Tube Works
I-7 Indiana Steel & Wire Co.

J1 Jackson Iron & Steel Co.
J3 Jessop Steel Co.
J4 Johnson Steel & Wire Co.
J5 Jones & Laughlin Steel
J6 Joslyn Mfg. & Supply
J7 Judson Steel Corp.
J8 Jersey Shore Steel Co.

K1 Kaiser Steel Corp.
K2 Keokuk Electro-Metals
K3 Keystone Drawn Steel
K4 Keystone Steel & Wire
K7 Kenmore Metals Corp.

L1 Laclede Steel Co.
L2 LaSalle Steel Co.
L3 Latrobe Steel Co.
L6 Lone Star Steel Co.
L7 Lukens Steel Co.
L8 Leschen Wire Rope Div., H. K. Porter Co. Inc.

M1 McLouth Steel Corp.
M4 Mahoning Valley Steel
M6 Mercer Pipe Div., Sawhill Tubular Products
M8 Mid-States Steel & Wire
M12 Moltrup Steel Products
M14 McInnes Steel Co.
M16 Md. Fine & Specialty Wire Co. Inc.
M17 Metal Forming Corp.
M18 Milton Steel Div., Merritt-Chapman&Scott
M21 Mallory-Sharon Metals Corp.
M22 Mill Strip Products Co.
M23 Mill Strip Products Co. of Pennsylvania

N1 National-Standard Co.
N2 National Supply, Armco Steel Corp.
N3 National Tube Div., U. S. Steel Corp.
N5 Nelsen Steel & Wire Co.
N6 New England High Carbon Wire Co.
N8 Newman-Crosby Steel
N14 Northwest. Steel Rolling Mills Inc.
N15 Northwestern S.&W. Co.
N20 Neville Ferro Alloy Co.

O4 Oregon Steel Mills

P1 Pacific States Steel Corp.
P2 Pacific Tube Co.
P4 Phoenix Steel Corp.
P5 Pilgrim Drawn Steel
P6 Pittsburgh Coke&Chem.
P7 Pittsburgh Steel Co.
P11 Pollak Steel Co.
P12 Portsmouth Div., Detroit Steel Corp.
P13 Precision Drawn Steel
P15 Pittsburgh Metallurgical
P16 Page Steel & Wire Div., American Chain & Cable
P17 Plymouth Steel Corp.
P19 Pitts. Rolling Mills
P20 Prod. Steel Strip Corp.
P22 Phoenix Mfg. Co.
P24 Phil. Steel & Wire Corp.

R2 Republic Steel Corp.
R3 Rhode Island Steel Corp.
R5 Roebling's Sons, John A.
R6 Rome Strip Steel Co.
R8 Reliance Div., Eaton Mfg.
R9 Rome Mfg. Co.
R10 Rodney Metals Inc.

S1 Seneca Wire & Mfg. Co.
S3 Sharon Steel Corp.
S4 Sharon Tube Co.
S5 Sheffield Div., Armco Steel Corp.
S6 Shenango Furnace Co.
S7 Simmons Co.
S8 Simonds Saw & Steel Co.
S12 Spencer Wire Corp.
S13 Standard Forgings Corp.
S14 Standard Tube Co.
S15 Stanley Works
S17 Superior Drawn Steel Co.
S18 Superior Steel Div., Copperweld Steel Co.
S19 Sweet's Steel Co.
S20 Southern States Steel
S23 Superior Tube Co.
S25 Stainless Welded Prod.
S26 Specialty Wire Co. Inc.
S30 Sierra Drawn Steel Div., Bliss & Laughlin Inc.
S40 Seneca Steel Service
S41 Stainless & Strip Div., J & L Steel Corp.
S42 Southern Elec. Steel Co.
S43 Seymour Mfg. Co.
S44 Screw & Bolt Corp. of America
S45 Somers Brass Co.
S46 Steel Co. of Canada

T2 Tenn. Coal & Iron Div., U. S. Steel Corp.
T3 Tenn. Products & Chemical Corp.
T4 Texas Steel Co.
T5 Thomas Strip Div., Pittsburgh Steel Co.
T6 Thompson Wire Co.
T7 Timken Roller Bearing
T9 Tonawanda Iron Div., Am. Rad. & Stan. San.
T13 Tube Methods Inc.
T19 Techalloy Co. Inc.

U3 Union Wire Rope, Armco Steel Corp.
U4 Universal-Cyclops Steel
U5 U. S. Steel Corp.
U6 U. S. Pipe & Foundry
U7 Ulbrich Stainless Steels
U8 U. S. Steel Supply Div., U. S. Steel Corp.
U11 Union Carbide Metals Co.
U13 Union Steel Corp.

V2 Vanadium-Alloy Steel
V3 Vulcan-Kidd Steel Div., H. K. Porter Co.

W1 Wallace Barnes Steel Div., Associated Spring
W2 Wallingford Steel Co.
W3 Washburn Wire Co.
W4 Washington Steel Corp.
W6 Weirton Steel Co.
W8 Western Automatic Machine Screw Co.
W9 Wheatland Tube Co.
W10 Wheeling Steel Corp.
W12 Wickwire Spencer Steel Div., Colo. Fuel & Iron
W13 Wilson Steel & Wire Co.
W14 Wisconsin Steel Div., International Harvester
W15 Woodward Iron Co.
W18 Wyckoff Steel Co.

Y1 Youngstown Sheet & Tube

STRIP

STRIP, Hot-Rolled Carbon

Ala.City,Ala.(27) R2 ...5.10
Allenport,Pa. P7 .....5.10
Alton,Ill. L1 .....5.30
Ashland,Ky.(8) A10 ...5.10
Atlanta A11 .....5.10
Bessemer,Ala. T2 .....5.10
Birmingham C15 .....5.10
Conshohocken,Pa. A3 ...5.15
Detroit M1 .....5.10
Ecorse,Mich. G5 .....5.10
Fairfield,Ala. T2 .....5.10
Farrell,Pa. S3 .....5.10
Fontana,Calif. K1 .....5.825
Gary,Ind. U5 .....5.10
Ind.Harbor,Ind. I-2, Y1.5.10
Johnstown,Pa.(25) B2 ..5.10
Lackaw'na,N.Y.(25) B2.5.10
LosAngeles(25) B3 .....5.85
LosAngeles C1 .....8.60
Minnequa,Colo. C10 ....6.20
Riverdale,Ill. A1 .....5.10
SanFrancisco S7 .....6.60
Seattle(25) B3 .....6.10
Seattle N14 .....6.60
Sharon,Pa. S3 .....5.10
S.Chicago,Ill. W14 .....5.10
S.SanFrancisco(25) B3 ..5.85
SparrowsPoint,Md. B2 ..5.10
Torrance,Calif. C11 ....5.85
Warren,O. R2 .....5.10
Weirton,W.Va. W6 .....5.10
Youngstown U5, Y1 ....5.10

STRIP, Hot-Rolled Alloy

Carnegie,Pa. S18 .....8.40
Farrell,Pa. S3 .....8.40
Gary,Ind. U5 .....8.40
Houston S5 .....8.65
Ind.Harbor,Ind. Y1 ....8.40
KansasCity,Mo. S5 .....8.65
LosAngeles B3 .....9.60
Lowellville,O. S3 .....8.40
Newport,Ky. A2 .....8.40
Sharon,Pa. A2, S3 .....8.40
S.Chicago,Ill. W14 .....8.40
Youngstown U5, Y1 ....8.40

STRIP, Hot-Rolled High-Strength, Low-Alloy

Ashland,Ky. A10 .....7.575
Bessemer,Ala. T2 .....7.575
Conshohocken,Pa. A3 ..7.575
Ecorse,Mich. G5 .....7.575
Fairfield,Ala. T2 .....7.575
Farrell,Pa. S3 .....7.575
Gary,Ind. U5 .....7.575
Ind.Harbor,Ind. I-2, Y1.7.575
Lackawanna,N.Y. B2 ..7.575
LosAngeles(25) B3 ....8.325
Seattle(25) B3 .....8.575
Sharon,Pa. S3 .....7.575
S.Chicago,Ill. W14 .....7.575
S.SanFrancisco(25) B3..8.325
SparrowsPoint,Md. B2 ..7.575
Warren,O. R2 .....7.575
Weirton,W.Va. W6 .....7.575
Youngstown U5, Y1 ...7.575

STRIP, Hot-Rolled Ingot Iron

Ashland,Ky.(8) A10 ....5.35
Warren,O. R2 .....5.875

STRIP, Cold-Rolled Carbon

Anderson,Ind. G6 .....7.425
Baltimore T6 .....7.425
Boston T6 .....7.975
Buffalo S40 .....7.425
Cleveland A7 .....7.425
Dearborn,Mich. S3 ....7.425
Detroit D2, M1, P20 ..7.425
Dover,O. G6 .....7.425
Evanston,Ill. M22 .....7.425
Farrell,Pa. S3 .....7.425
Follansbee,W.Va. W10 .7.425
Fontana,Calif. K1 .....9.20
Franklin Park,Ill. T6 ..7.425
Ind.Harbor,Ind. Y1 ....7.425
Indianapolis S41 .....7.575
LosAngeles C1, S41 ....9.30
McKeesport,Pa. E10 ...7.525
NewBedford,Mass. R10.7.875
NewBritain,Conn. S15 .7.875
NewCastle,Pa. B4, M23.7.425
NewHaven,Conn. D2 ...7.875
NewKensington,Pa. A6.7.425
Pawtucket,R.I. R3, N8.7.975
Philadelphia P24 .....7.875
Riverdale,Ill. A1 .....7.425
Rome,N.Y.(32) R6 ....7.425
Sharon,Pa. S3 .....7.425
Trenton,N.J.(31) R5 ...8.875
Warren,O. R2, T5 ....7.425
Worcester,Mass. A7 ...7.975
Youngstown Y1 .....7.425
Youngstown S41 .....7.425

STRIP, Cold-Rolled Alloy

Boston T6 .....15.90
Carnegie,Pa. S18 .....15.55
Cleveland A7 .....15.55
Dover,O. G6 .....15.55
Farrell,Pa. S3 .....15.55
Franklin Park,Ill. T6 ..15.55
Harrison,N.J. S18 .....15.55
Indianapolis S41 .....15.70
LosAngeles S41 .....17.75
Lowellville,O. S3 .....15.55
Pawtucket,R.I. S8 .....15.90
Riverdale,Ill. A1 .....15.55
Sharon,Pa. S3 .....15.55
Worcester,Mass. A7 ...15.85
Youngstown S41 .....15.55

STRIP, Cold-Rolled High-Strength, Low-Alloy

Cleveland A7 .....10.80
Dearborn,Mich. S3 ....10.80
Dover,O. G6 .....10.80
Farrell,Pa. S3 .....10.80
Ind.Harbor,Ind. Y1 ....10.80
Sharon,Pa. S3 .....10.80
Warren,O. R2 .....10.80
Weirton,W.Va. W6 ....10.80
Youngstown Y1 .....10.80

STRIP, Galvanized (Continuous)

Farrell,Pa. S3 .....7.50
Sharon,Pa. S3 .....7.50

STRIP, Cold-Finished Spring Steel (Annealed)

	0.26-0.40C	0.41-0.60C	0.61-0.80C	0.81-1.05C	1.06-1.35C
Anderson,Ind. G6	9.10	....	....	....	....
Baltimore T6	9.50	10.70	12.90	15.90	18.85
Boston T6	9.50	10.70	12.90	15.90	18.85
Bristol,Conn. W1	....	10.70	12.90	16.10	19.30
Carnegie,Pa. S18	8.95	10.40	12.60	15.60	....
Cleveland A7	8.95	10.40	12.60	15.60	18.55
Dearborn,Mich. S3	9.05	10.50	12.70	....	....
Detroit D2	9.05	10.50	12.70	15.70	....
Dover,O. G6	8.95	10.40	12.60	15.60	18.55
Evanston,Ill. M22	9.05	10.40	12.60	15.60	....
Farrell,Pa. S3	8.95	10.40	12.60	15.60	18.55
Fostoria,O. S1	10.05	10.40	12.60	15.60	....
FranklinPark,Ill. T6	9.05	10.40	12.60	15.60	18.55
Harrison,N.J. C18	....	....	12.90	16.10	19.30
Indianapolis S41	9.10	10.55	12.60	15.60	18.55
LosAngeles C1	11.15	12.60	14.80	17.80	....
LosAngeles S41	11.15	12.60	14.80	....	....
NewBritain,Conn. S15	9.40	10.70	12.90	15.90	18.85
NewCastle,Pa. B4, M23	8.95	10.40	12.60	15.60	....
NewHaven,Conn. D2	9.40	10.70	12.90	15.90	....
NewKensington,Pa. A6	8.95	10.40	12.60	15.60	....
NewYork W3	....	10.70	12.90	16.10	19.30
Pawtucket,R.I. N8	9.50	10.70	12.90	15.90	18.85
Riverdale,Ill. A1	9.05	10.40	12.60	15.60	18.55
Rome,N.Y. R6	8.95	10.40	12.60	15.60	18.55
Sharon,Pa. S3	8.95	10.40	12.60	15.60	18.55
Trenton,N.J. R5	....	10.70	12.90	15.90	18.85
Warren,O. T5	8.95	10.40	12.60	15.60	18.55
Worcester,Mass. A7, T6	9.50	10.70	12.90	15.90	18.85
Youngstown S41	8.95	10.40	12.60	15.60	18.55

Spring Steel (Tempered)

	Up to 0.80C	0.81-1.05C	1.06-1.35C
Bristol,Conn. W1	18.85	22.95	27.80
Buffalo W12	18.85	....	....
Fostoria,O. S1	19.05	22.15	....
FranklinPark,Ill. T6	19.20	23.30	28.15
Harrison,N.J. C18	18.85	22.95	27.80
NewYork W3	18.85	22.95	27.80
Palmer,Mass. W12	18.85	....	....
Trenton,N.J. R5	18.85	22.95	27.80
Worcester,Mass. A7, T6	18.85	22.95	27.80
Youngstown S41	19.20	23.30	28.15

STRIP, C.R., Electrogalvanized

Cleveland A7 .....7.425*
Dover,O. G6 .....7.425*
Evanston,Ill. M22 ....7.525*
McKeesport,Pa. E10 ..7.50*
NewCastle,Pa. M23 ..7.425*
Riverdale,Ill. A1 .....7.525*
Warren,O. B9, S3, T5.7.425*
Worcester,Mass. A7 ...7.975
Youngstown S41 .....7.425*

Plus galvanizing extras.

STRIP, Cold-Rolled Ingot Iron

Warren,O. R2 .....8.175

TIGHT COOPERAGE HOOP

Atlanta A11 .....5.825
Farrell,Pa. S3 .....5.525
Riverdale,Ill. A1 .....5.675
Sharon,Pa. S3 .....5.525
Youngstown U5 .....5.525

TIN MILL PRODUCTS

TIN PLATE, Electrolytic (Base Box)	0.25 lb	0.50 lb	0.75 lb
Aliquippa,Pa. J5	$9.10	$9.35	$9.75
Fairfield,Ala. T2	9.10	9.35	9.75
Fairless,Pa. U5	9.10	9.35	9.75
Fontana,Calif. K1	9.75	10.00	10.40
Gary,Ind. U5	9.10	9.35	9.75
GraniteCity,Ill. G4	9.20	9.45	9.85
IndianaHarbor,Ind. I-2, Y1	9.10	9.35	9.75
Irvin,Pa. U5	9.10	9.35	9.75
Niles,O. R2	9.10	9.35	9.75
Pittsburg,Calif. C11	9.75	10.00	10.40
SparrowsPoint,Md. B2	9.10	9.35	9.75
Weirton,W.Va. W6	9.10	9.35	9.75
Yorkville,O. W10	9.10	9.35	9.75

ELECTROLYTIC TIN-COATED SHEET (Dollars per 100 lb)

Aliquippa,Pa. J5 (21-27 Ga.)	7.90	8.10	....
IndianaHarbor,Ind. Y1 (20-27 Ga.)	7.90	....	....
Niles,O. R2 (20-27 Ga.)	7.90	8.10	8.30

ELECTROLYTIC THIN TIN PLATE (¼ lb coating in coils)

	Base Box			
	45 lb	50 lb	55 lb	60 lb
Fairfield,Ala. T2	$6.10	$6.25	$6.40	$6.55
Fairless,Pa. U5	6.10	6.25	6.40	6.55
Gary,Ind. U5	6.10	6.25	6.40	6.55
IndianaHarbor,Ind. I-2	6.10	6.25	6.40	6.55
Irvin,Pa. U5	6.10	6.25	6.40	6.55
SparrowsPoint,Md. B2	6.10	6.25	6.40	6.55
Weirton,W.Va. W6	6.10	6.25	6.40	6.55

TIN PLATE,Hot Dipped 1.25 Common Coke	lb	1.50 lb
Aliquippa,Pa. J5	$10.40	$10.65
Fairfield,Ala. T2	10.40	10.65
Fairless,Pa. U5	10.40	10.65
Fontana,Calif.K1	11.05	11.30
Gary,Ind. U5	10.40	10.65
Irvin,Pa. U5	10.40	10.65
Pitts.,Calif. C11	11.05	11.30
Sp.Pt.,Md. B2	10.40	10.65
Weirton,W.Va.W6	10.40	10.65
Yorkville,O. W10	10.40	10.65

BLACK PLATE (Base Box)

Aliquippa,Pa. J5	$8.20
Fairfield,Ala. T2	8.20
Fairless,Pa. U5	8.20
Fontana,Calif. K1	8.85
Gary,Ind. U5	8.20
GraniteCity,Ill. G4	8.30
Ind.Harbor,Ind. I-2, Y1	8.20
Irvin,Pa. U5	8.20
Niles,O. R2	8.20
Pittsburg,Calif. C11	8.85
SparrowsPoint,Md. B2	8.20
Weirton,W.Va. W6	8.20
Yorkville,O. W10	8.20

HOLLOWARE ENAMELING (Black Plate) (29 Gage)

Aliquippa,Pa. J5	7.85
Gary,Ind. U5	7.85
GraniteCity,Ill. G4	7.95
Ind.Harbor,Ind. Y1	7.85
Irvin,Pa. U5	7.85
Yorkville,O. W10	7.85

SILICON STEEL

C.R. COILS & CUT LENGTHS (22 Ga.)

Fully Processed (Semiprocessed ½c lower)	Field	Armature	Electric	Motor	Dynamo
BeechBottom,W.Va. W10	....	11.70	12.40	13.35	14.65
Brackenridge,Pa. A4	....	....	12.40	13.55	14.65
GraniteCity,Ill. G4	9.975*	11.30*	12.00*	13.15*	....
IndianaHarbor,Ind. I-2	9.875*	11.20*	11.90*	13.05*	....
Mansfield,O. E6	9.875*	11.70	12.40	13.55	14.65
Newport,Ky. A2	9.875	11.70*	12.40*	13.55*	14.65*
Niles,O. M21	9.875*	11.70	12.40	13.55	....
Vandergrift,Pa. U5	9.875*	11.70	12.40	13.55	14.65
Warren,O. R2	9.875*	11.70	12.40	13.55	14.65
Zanesville,O. A10	....	11.70†	12.40	13.55	14.65

	Stator
Mansfield,O. E6	8.10
Vandergrift,Pa. U5	8.10
Warren,O R2 (Locore)	8.10

SHEETS (22 Ga., coils & cut lengths)

Fu.ly Processed (Semiprocessed ½c lower)	T-72	T-65	T-58	T-52
BeechBottom,W.Va. W10	15.70	16.30	16.80	17.85
Zanesville,O. A10	15.70	16.30	16.80	17.85
Vandergrift,Pa. U5	15.70	16.30	16.80	17.85

C.R. COILS & CUT LENGTHS (22 Ga.)	Grain Oriented T-100	T-90	T-80	T-73	T-66	T-72
Brackenridge,Pa. A4	....	18.10	19.70	20.20	20.70	15.70††
Butler,Pa. A10	....	....	....	19.70	20.20	20.70 ....
Vandergrift,Pa. U5	17.10	18.10	19.70	20.20	20.70	15.70
Warren,O. R2	....	....	....	....	....	15.70‡

*Semiprocessed. †Fully processed only. ‡Coil annealed; semiprocessed ½c lower. ††Coils only.

WIRE

WIRE, Manufacturers Bright, Low Carbon

AlabamaCity,Ala. R2 ...8.00
Aliquippa,Pa. J5 .....8.00
Alton,Ill. L1 .....8.20
Atlanta A1 .....8.00
Bartonville,Ill. K4 .....8.10
Buffalo W12 .....8.00
Chicago W13 .....8.00
Cleveland A7, C20 .....8.00
Crawfordsville,Ind. MS..8.10
Donora,Pa. A7 .....8.00
Duluth A7 .....8.00
Fairfield,Ala. T2 .....8.00
Fostoria,O.(24) S1 .....8.10
Houston S5 .....8.25
Jacksonville,Fla. M8 ....8.35
Johnstown,Pa. B2 .....8.00
Joliet,Ill. A7 .....8.00
KansasCity,Mo. S5 .....8.25
Kokomo,Ind. C16 .....8.10
LosAngeles B3 .....8.95
Minnequa,Colo. C10 .....8.25
Monessen,Pa. P7, P16 ..8.00
Palmer,Mass. W12 .....8.30
Pittsburg,Calif. C11 ....8.95
Portsmouth,O. P12 .....8.00
S.Chicago,Ill. R2 .....8.00
S.SanFrancisco C10 ....8.95
SparrowsPoint,Md. B2 ..8.10
Sterling,Ill.(1) N15 ....8.00
Sterling,Ill. N15 .....8.10
Struthers,O. Y1 .....8.00
Waukegan,Ill. A7 .....8.00
Worcester,Mass. A7 ....8.30

WIRE, Cold Heading Carbon

Elyria,O. W8 .....8.00

WIRE, Gal'd., for ACSR

Bartonville,Ill. K4 ....12.65
Buffalo W12 .....13.40
Cleveland A7 .....12.65
Donora,Pa. A7 .....12.65
Duluth A7 .....12.65
Johnstown,Pa.(10) B2 .12.65
KansasCity,Mo. U3 ...12.90
LosAngeles(2) B3 .....13.60
Minnequa,Colo. C10 ..12.775
Monessen,Pa. P7, P16..12.65
Muncie,Ind. I-7 .....13.60
NewHaven,Conn. A7 ..12.95
PalmerMass. W12 ....13.70
Pittsburg,Calif. C11 ....13.45
Portsmouth,O. P12 ....12.65
Roebling,N.J. R5 .....12.95
SparrowsPt.Md.,(10)B2 12.75
Struthers,O. Y1 .....13.40
Trenton,N.J. A7 .....12.95
Waukegan,Ill. A7 .....12.65
Worcester,Mass. A7 ...12.95

WIRE, Upholstery Spring

Aliquippa,Pa. J5 .....9.75
Alton,Ill. L1 .....9.95
Buffalo W12 .....9.75
Cleveland A7 .....9.75
Donora,Pa. A7 .....9.75
Duluth A7 .....9.75
Johnstown,Pa. B2 .....9.75
KansasCity,Mo. S5, U3.10.00
Kokomo,Ind. C16 .....9.85
LosAngeles B3 .....10.70
Minnequa,Colo. C10 ....9.95
Monessen,Pa. P7, P16 ..9.75
NewHaven,Conn. A7 ...10.95
Palmer,Mass. W12 ....10.05
Pittsburg,Calif. C11 ..10.075
Portsmouth,O. P12 .....9.75
Roebling,N.J. R5 .....10.05
S.Chicago,Ill. R2 .....9.75
S.SanFrancisco C10 ....10.70
SparrowsPt.,Md. B2 ...9.85
Struthers,O. Y1 .....9.75
Trenton,N.J. A7 .....10.05
Waukegan,Ill. A7 .....9.75
Worcester,Mass. A7 ....10.05

WIRE, MB Spring, High-Carbon

Aliquippa,Pa. J5 .....9.75
Alton,Ill. L1 .....9.95
Bartonville,Ill. K4 .....9.85
Buffalo W12 .....9.75
Cleveland A7 .....9.75
Donora,Pa. A7 .....9.75
Duluth A7 .....9.75
Fostoria,O. S1 .....9.80
Johnstown,Pa. B2 .....9.75
KansasCity,Mo. S5, U3.10.00
LosAngeles B3 .....10.70
Milbury,Mass.(12) N6 .10.05
Minnequa,Colo. C10 ....9.95
Monessen,Pa. P7, P16 ..9.75
Muncie,Ind. I-7 .....9.95
Palmer,Mass. W12 ....10.05
Pittsburg,Calif. C11 ....10.70
Portsmouth,O. P12 .....9.75
Roebling,N.J. R5 .....10.05
S.Chicago,Ill. R2 .....9.75
S.SanFrancisco C10 ....10.70
SparrowsPt.,Md B2 ....9.85
Struthers,O. Y1 .....9.75
Trenton,N.J. A7 .....10.05
Waukegan,Ill. A7 .....9.75
Wor'ster,Mass.A7,J4,T6 10.05

WIRE, Fine & Weaving (8" Coils)

Alton,Ill. L1 .....16.50
Bartonville,Ill. K4 ....16.40
Chicago W13 .....16.30
Cleveland A7 .....16.30
Crawfordsville,Ind. MS.16.40
Fostoria,O. S1 .....16.30
Houston S5 .....16.55
Jacksonville,Fla. M8 ...16.65
Johnstown,Pa. B2 .....16.30
KansasCity,Mo. S5 ....16.55
Kokomo,Ind. C16 .....16.30
Minnequa,Colo. C16 ....16.55
Monessen,Pa. P16 .....16.30
Muncie,Ind. I-7 .....16.50
Palmer,Mass. W12 ....16.60
S.SanFrancisco C10 ....17.15
Waukegan,Ill. A7 .....16.30
Worcester,Mass. A7, J6.16.60

ROPE WIRE (A)

Bartonville,Ill. K4 ....13.45
Buffalo W12 .....13.45
Fostoria,O. S41 .....13.45
Johnstown,Pa. B2 .....13.45
Monessen,Pa. P7 .....13.45
Muncie,Ind. I-7 .....13.65
Palmer,Mass. W12 ....13.75
Portsmouth,O. P12 ....13.45
Roebling,N.J. R5 .....13.75
St.Louis L8 .....13.45
SparrowsPt.,Md. B2 ...13.55
Struthers,O. Y1 .....13.45
Worcester,Mass. J4 ...13.75

(A) Plow and Mild Plow; add 0.25c for Improved Plow.

WIRE, Tire Bead

Bartonville,Ill. K4	17.15
Monessen,Pa. P16	17.15
Roebling,N.J. R5	17.65

WIRE, Cold-Rolled Flat

Anderson,Ind. G6	12.35
Baltimore T6	12.65
Boston T6	12.65
Buffalo W12	12.35
Chicago W13	12.45
Cleveland A7	12.35
Crawfordsville,Ind. MS	12.35
Dover,O. G6	12.35
Evanston,Ill. M22	12.45
Farrell,Pa. S3	12.35
Fostoria,O. S1	12.35
FranklinPark,Ill. T6	12.45
Kokomo,Ind. C16	12.35
Massillon,O. R8	12.35
Milwaukee C23	12.55
Monessen,Pa. P7, P16	12.35
NewCastle,Pa. M23	12.35
Palmer,Mass. W12	12.65
Pawtucket,R.I. N8	12.65
Philadelphia P24	12.65
Riverdale,Ill. A1	12.45
Rome,N.Y. R6	12.35
Sharon,Pa. S3	12.35
Trenton,N.J. R5	12.65
Warren,O. B9	12.35
Worcester,Mass. A7, T6	12.65

NAILS, Stock Sizes

	Col.
AlabamaCity,Ala. R2	173
Aliquippa,Pa. J5	173
Atlanta A11	173
Bartonville,Ill. K4	175
Chicago W13	173
Cleveland A9	173
Crawfordsville,Ind. MS	175
Donora,Pa. A7	173
Duluth A7	173
Fairfield,Ala. T2	173
Houston S5	178
Jacksonville,Fla. M8	175
Johnstown,Pa. B2	173
Joliet,Ill. A7	173
KansasCity,Mo. S5	178
Kokomo,Ind. C16	175
Minnequa,Colo. C10	178
Monessen,Pa. P7	173
Pittsburg,Calif. C11	192
Rankin,Pa. A7	173
S.Chicago,Ill. R2	173
SparrowsPt.,Md. B2	175
Sterling,Ill.(7) N15	175
Worcester,Mass. A7	179

(To Wholesalers: per cwt)

Galveston,Tex. D7	$10.30

NAILS, CUT (100 lb kegs)

Wheeling,W.Va. W10	$10.10

POLISHED STAPLES

	Col.
AlabamaCity,Ala. R2	175
Aliquippa,Pa. J5	173
Atlanta A11	173
Bartonville,Ill. K4	175
Crawfordsville,Ind. MS	177
Donora,Pa. A7	173
Duluth A7	173
Fairfield,Ala. T2	173
Houston S5	180
Jacksonville,Fla. M8	177
Johnstown,Pa. B2	173
Joliet,Ill. A7	173
KansasCity,Mo. S5	180
Kokomo,Ind. C16	177
Minnequa,Colo. C10	178
Pittsburg,Calif. C11	194
Rankin,Pa. A7	173
S. Chicago,Ill. R2	175
SparrowsPt.,Md. B2	175
Sterling,Ill.(7) N15	175
Worcester,Mass. A7	179

TIE WIRE, Automatic Baler

(14½ Ga.) per 97 lb net box)
Coil No. 3150

AlabamaCity,Ala. R2	$8.78
Atlanta A11	10.36
Bartonville,Ill. K4	8.88
Buffalo W12	10.26
Chicago W13	9.24
Crawfordsville,Ind. MS	8.88
Donora,Pa. A7	8.78
Duluth A7	8.78
Fairfield,Ala. T2	8.78
Houston S5	9.02
Jacksonville,Fla. M8	8.88
Johnstown,Pa. B2	8.78
Joliet,Ill. A7	8.78
KansasCity,Mo. S5	9.02
Kokomo,Ind. C16	8.88
LosAngeles B3	9.20
Minnequa,Colo. C10	8.02
Pittsburg,Calif. C11	*9.20*
S.Chicago,Ill. R2	8.78
S.SanFrancisco C10	9.94
SparrowsPt.,Md. B2	8.88
Sterling,Ill.(3?) N15	8.88

Coil No. 6500 Stand.
100 lb coil

AlabamaCity,Ala. R2	$9.06
Atlanta A11	10.70
Bartonville,Ill. K4	9.16
Buffalo W12	10.60
Chicago W13	9.54
Crawfordsville,Ind. MS	9.16
Donora,Pa. A7	9.06
Duluth A7	9.06
Fairfield,Ala. T2	9.06
Houston S5	9.30
Jacksonville,Fla. M8	9.16
Johnstown,Pa. B2	9.06
Joliet,Ill. A7	9.06
KansasCity,Mo. S5	9.30
Kokomo,Ind. C16	9.16
Los Angeles B3	9.50
Minnequa,Colo. C10	9.30
Pittsburg,Calif. C11	*9.50*
S.Chicago,Ill. R2	9.06
S.SanFrancisco C10	10.26
SparrowsPt.,Md. B2	9.16
Sterling,Ill.(3?) N15	9.16

Coil No. 6500 Interim
100 lb coil

AlabamaCity,Ala. R2	$9.11
Atlanta A11	10.75
Bartonville,Ill. K4	9.21
Buffalo W12	10.65
Chicago W13	9.59
Crawfordsville,Ind. MS	9.21
Donora,Pa. A7	9.11
Duluth A7	9.11
Fairfield,Ala. T2	9.11
Houston S5	9.35
Jacksonville,Fla. M8	9.21
Johnstown,Pa. B2	9.11
Joliet,Ill. A7	9.11
KansasCity,Mo. S5	9.35
Kokomo,Ind. C16	9.21
LosAngeles B3	9.55
Minnequa,Colo. C10	9.35
Pittsburg,Calif. C11	*9.55*
S.Chicago,Ill. R2	9.11
S.SanFrancisco C10	10.31
SparrowsPt.,Md. B2	9.21
Sterling,Ill.(3?) N15	9.21

BALE TIES, Single Loop

	Col.
AlabamaCity,Ala. R2	212
Atlanta A11	212
Bartonville,Ill. K4	214
Crawfordsville,Ind. MS	214
Donora,Pa. A7	212
Duluth A7	212
Fairfield,Ala. T2	212
Houston S5	217
Jacksonville,Fla. M8	214
Joliet,Ill. A7	212
KansasCity,Mo. S5	217
Kokomo,Ind. C16	214
Minnequa,Colo. C10	217
SparrowsPt.,Md. B2	214
Sterling,Ill.(7) N15	214

FENCE POSTS

	Col.
Birmingham C15	177
ChicagoHts.,Ill. C2, I-2	177
Duluth A7	177
Franklin,Pa. F5	177
Johnstown,Pa. B2	177
Marion,O. P11	177
Minnequa,Colo. C10	182
Tonawanda,N.Y. B12	177

WIRE, Barbed

	Col.
AlabamaCity,Ala. R2	193••
Aliquippa,Pa. J5	190§
Atlanta A11	197•
Bartonville,Ill. K4	199
Crawfordsville,Ind. MS	198
Donora,Pa. A7	193†
Duluth A7	193†
Fairfield,Ala. T2	193†
Houston S5	198••
Jacksonville,Fla. M8	198
Johnstown,Pa. B2	196§
Joliet,Ill. A7	193†
KansasCity,Mo. S5	198••
Kokomo,Ind. C16	195†
Minnequa,Colo. C10	198••
Monessen,Pa. P7	196§
Pittsburg,Calif. C11	213†
Rankin,Pa. A7	193†
S.Chicago,Ill. R2	193••
SparrowsPoint,Md. B2	198§
Sterling,Ill.(7) N15	198

WIRE (16 gage)	An'ld Galv. Stone	Galv. Stone
Ala.City,Ala.R2	17.85	19.40••
Ali'ppa,Pa. J5	17.85	19.65
Bartonville K4	17.95	19.80
Chicago W13	17.85	....
Cleveland A7	17.85	....
Craw'sville M8	17.95	19.80††
Fostoria,O. S1	18.35	19.90†
Houston S5	18.10	19.65••
Jacksonville M8	17.95	19.80††
Johnstown B2	17.85	19.65§
Kan.City,Mo. S5	18.10	....
Kokomo C16	17.95	19.50†
Minnequa C10	18.10	19.65••
P'im'r,Mass.W12	18.10	19.70†
Pitts.Calif. C11	18.20	19.75†
S.SanFran. C10	18.20	19.75••
SparrowsPt. B2	17.95	19.75§
St'ling(37) N15	17.95	19.80
Waukegan A7	17.85	19.40†
Worcester A7	18.15	....

WOVEN FENCE, 9-15 Ga. Col.

Ala.City,Ala. R2	187••
Aliq'ppa,Pa.9-11½ga.J5	190§
Atlanta A11	191•
Bartonville,Ill. K4	193
Crawfordsville,Ind. MS	192
Donora,Pa. A7	187†
Duluth A7	187†
Fairfield,Ala. T2	187†
Houston S5	192••
Jacksonville,Fla. M8	192
Johnstown,Pa.(42) B2	190§
Joliet,Ill. A7	187†
KansasCity,Mo. S5	192••
Kokomo,Ind. C16	189†
Minnequa,Colo. C10	192••
Pittsburg,Calif. C11	210†
Rankin,Pa. A1	187†
S.Chicago,Ill. R2	187••
Sterling,Ill.(7) N15	192

WIRE, Merchant Quality

6 to 8 gage	An'ld Galv.
Ala.City,Ala. R2	9.00 9.55••
Aliquippa J5	8.65 9.325§
Atlanta(48) A11	9.00 9.75•
Bartonville(48) K4	9.85 19.90
Buffalo W12	9.00 9.55†
Chicago W13	9.00 9.55••
Cleveland A7	9.00 ....
Crawfordsville M8	9.10 9.80††
Donora,Pa. A7	9.00 9.55†
Duluth A7	9.00 9.55†
Fairfield T2	9.00 9.55
Houston(48) S5	9.25 9.80••
Jack'ville,Fla. M8	9.10 9.80†‡
Johnstown(48) B2	9.00 9.675§
Joliet,Ill. A7	9.00 9.55†
KansasCity(48)S5	9.25 9.80••
Kokomo(48) S16	9.10 9.65†
LosAngeles B3	9.95 10.625§
Minnequa C10	9.25 9.80••
Monessen(48) P7	8.65 9.35§
Palmer,Mass. W12	9.30 9.85†
Pitts.,Calif. C11	9.95 10.50†
Rankin,Pa. A7	9.00 9.55†
S.Chicago R2	9.00 9.55••
S.SanFran. C10	9.95 10.50••
Spar'wsPt.(48)B2	9.10 9.775§
St'ling(37)(48)N15	9.10 9.80
Struthers,O. Y1	9.00 9.65†
Worcester,Mass.A7	9.30 9.85†

Based on zinc prices of: •13.50c. ††5c. §10c. †Less than 10c. ††10.50c. ‡‡11.10c. ••Subject to zinc equalization extras.

RIVETS

F.o.b. Cleveland and/or freight equalized with Pittsburgh, f.o.b. Chicago and/or freight equalized with Birmingham except where equalization is too great.

Structural ½ in. larger 12.85 7/16 in. and smaller by 6 in. and shorter: 15% off list.

FASTENERS

(Consumer discounts per cent off list prices, orders for 1 container for assorted sizes; for less than container quantities, add 25 per cent; attaching nuts to bolts, package sizes, add 7.5 per cent: heavy hex nuts 1⅛ in. through 1½ in. tapped 8 threads, add 10 per cent)

HEX HEAD CAP SCREWS, coarse, or fine thread, packaged or bulk, with or without hex nuts, 1020 steel bright and high carbon heat treated. ¼ in. thru 1 in. diam., listed lengths:

Hot Galvanized and Zinc Plated:

Packaged	39.25
Bulk	46

BOLTS, Standard stock sizes:

Plain Finish	50•
Hot Galvanized and Zinc Plated:	
Packaged	39.25
•Bulk	46

•Hot galvanized or zinc plated lag bolts only—for package or bulk quantities use applicable list less bulk discounts.

CAP AND SETSCREWS,

Fillister Head, Cap Screws, Coarse Thread:

Packaged	+55
Bulk	+16

Flat Head Cap Screws:

¾ in. and smaller, 6 in. and shorter:	
Packaged	+85
Bulk	+38

Setscrews, Square Head, Cup Point, Coarse Thread:

Through 1 in. diam., 6 in. and shorter:	
Packaged	+ 5
Bulk	19
Through 1 in. diam., longer than 6 in.:	
Packaged	+29

HEXAGON NUTS: American Standard: Finished hex, hex jam, and hex slotted coarse or fine thread, ¼ in. through 3 in., finished hex thick, thick and slotted, castle, fine thread, ¼ in. through 1½ in., semifinished hex heavy, heavy and jam, heavy and slotted, coarse thread, ¼ in. through 4 in., and

SQUARE NUTS, American Standard: Regular square and heavy square, coarse thread, ¼ in. through 2 in.: 50

Plain Finish

Hot Galvanized and Zinc Plated:

Packaged	39.25
Bulk	46

PRESTRESSED STRAND

(High strength, stress relieved; 7 wire uncoated. Net prices per 1000 ft, 40,000 lb and over)

	Standard Diameter, Inches				
	1/4	5/16	3/8	7/16	1/2
Buffalo W12	$26.20	$38.50	$47.90	$61.30	$80.30
KansasCity,Mo. U3	26.20	38.50	47.90	61.30	80.30
Minnequa,Colo. C10	26.20	38.50	47.90	61.30	80.30
Pittsburg,Calif. C11	26.20	38.50	47.90	61.30	80.30
Roebling,N.J. R5	26.20	38.50	47.90	61.30	80.30
SparrowsPoint,Md. B2	26.20	38.50	47.90	61.30	80.30
St.Louis L8	26.20	38.50	47.90	61.30	80.30
Waukegan,Ill. A7	26.20	38.50	47.90	61.30	80.30

BOILER TUBES

Net base c.l. prices, dollars per 100 ft, mill; minimum wall thickness, cut length 10 to 24 ft, inclusive.

O.D. In.	B.W. Gage	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.
1	13	....	27.24	23.12
1¼	13	....	32.25	24.41
1½	13	30.42	35.65	26.98
1¾	13	35.94	42.12	31.89
2	13	40.28	47.21	35.74
2¼	13	45.36	58.17	40.26
2¼	12	49.24	57.72	43.70
2½	12	54.23	63.57	48.13
2¾	12	58.73	68.83	52.13
3	12	62.62	73.40	55.59

RAILWAY MATERIALS

Rails	Standard No. 1	Standard No. 2	All No. 2	Tee Rails 60 lb Under
Bessemer,Pa. U5	5.75	5.65	....	6.725
Ensley,Ala. T2	5.75	5.65	....	6.725
Fairfield,Ala. T2	....	....	....	6.725
Gary,Ind. U5	5.75	5.65	....	....
Huntington,W.Va. C15	....	....	....	6.725
Johnstown,Pa. B2	....	....	....(16)	6.725
Lackawanna,N.Y. B2	5.75	5.65	....	6.725
Minnequa,Colo. C10	5.75	5.65	....	7.225
Steelton,Pa. B2	5.75	5.65	....	....
Williamsport,Pa. S19	....	....	....	6.725

TIE PLATES

Fairfield,Ala. T2	6.875
Gary,Ind. U5	6.875
Lackawanna,N.Y. B2	6.875
Minnequa,Colo. C10	6.875
Seattle B3	7.025
Steelton,Pa. B2	6.875
Torrance,Calif. C11	7.025

JOINT BARS

Bessemer,Pa. U5	7.25
Fairfield,Ala. T2	7.25
Joliet,Ill. U5	7.25
Lackawanna,N.Y. B2	7.25
Minnequa,Colo. C10	7.25
Steelton,Pa. B2	7.25

AXLES

Ind.Harbor,Ind. S13	9.125
Johnstown,Pa. B2	9.125

SCREW SPIKES

Lebanon,Pa. B2	15.10

TRACK BOLTS, Untreated

Cleveland R2	15.35
KansasCity,Mo. S5	15.35
Lebanon,Pa. B2	15.35
Minnequa,Colo. C10	15.35
Pittsburgh S44	15.35
Seattle B3	15.85

STANDARD TRACK SPIKES

Fairfield,Ala. T2	10.10
Ind.Harbor,Ind. I-2, Y1	10.10
KansasCity,Mo. S5	10.10
Lebanon,Pa. B2	10.10
Minnequa,Colo. C10	10.10
Pittsburgh J5	10.10
Seattle B3	10.60
S.Chicago,Ill. R2	10.10
Struthers,O. Y1	10.10
Youngstown R2	10.10

FOOTNOTES

(1) Chicago base.
(2) Double galvanized.
(3) Merchant.
(4) Reinforcing.
(5) 1⅛ to under 1 7/16 in.; 1 7/16 to under 1 15/16 in.; 6.70c; 1 15/16 to 8 in., inclusive, 7.05c.
(6) Limited analyses only.
(7) Chicago base 2 cols. lower.
(8) 16 Ga. and heavier.
(9) Merchant quality; add 0.35c for special quality.
(10) Bethany A coating.
(12) Worcester, Mass., base.
(15) ⅜" and thinner.
(16) 40 lb and under.
(17) Flats only; 0.25 in. & heavier.
(23) Special quality.
(24) Deduct 0.05c, finer than 15 Ga.
(25) Bar mill bands.
(26) Deld. in mill zone, 5.65c.
(27) Bar mill sizes.
(28) Bonderized.
(30) Sheared; for universal mill add 0.45c.
(31) Widths over ⅝ in.; 7.375c, for widths ⅝ in. and under by 0.125 in. and thinner.
(32) Buffalo base.
(33) 14 Ga., 48 in.
(35) 72" and narrower.
(36) 54" and narrower.
(37) Chicago base, 10 points lower.
(38) 13 Ga. & lighter; 60" & narrower.
(39) 48" and narrower.
(43) 9-14½ Ga.
(44) To fabricators.
(48) 6-7 Ga.
(49) 3½ in. and smaller rounds and 2½ in. and smaller hexagons; 9.65c for larger rounds and hexagons and other shapes.

SEAMLESS STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	2		2½		3		3½		4		5		6	
List Per Ft	37c		58.5c		76.5c		92c		$1.09		$1.48		$1.92	
Pounds	3.68		5.82		7.62		9.20		10.89		14.81		19.18	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	+12.25	+28.75	+5.75	+23.5	+3.25	+21	+1.75	+19.5	+1.75	+19.5	+2	+19.75	0.5	+17.25
Ambridge, Pa. N2	+12.25	....	+5.75	....	+3.25	....	+1.75	....	+1.75	....	+2	....	0.5	....
Lorain, O. N3	+12.25	+28.75	+5.75	+23.5	+3.25	+21	+1.75	+19.5	+1.75	+19.5	+2	+19.75	0.5	+17.25
Youngstown Y1	+12.25	+28.75	+5.75	+23.5	+3.25	+21	+1.75	+19.5	+1.75	+19.5	+2	+19.75	0.5	+17.25

ELECTRICWELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Youngstown R2	+12.25	+28.75	+5.75	+23.5	+3.25	+21	+1.75	+19.5	+1.75	+19.5	+2	+19.75	0.5	+17.25

BUTTWELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	⅛		¼		⅜		½		¾		1		1¼	
List Per Ft	5.5c		6c		6c		8.5c		11.5c		17c		23c	
Pounds Per Ft	0.24		0.42		0.57		0.85		1.13		1.68		2.28	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Alton, Ill. L1	....	....	....	....	....	....	0.25	+17	3.25	+13	6.75	+8.5	9.25	+7.25
Benwood, W. Va. W10	1.5	+27	+10.5	+36	+21	+45.5	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Butler, Pa. F6	4.5	+24	+8.5	+34	+19.5	+44	....	....	....	....	....	....	....	....
Etna, Pa. N2	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Fairless, Pa. N3	....	....	....	....	....	....	0.25	+17	3.25	+13	6.75	+8.5	9.25	+7.25
Fontana, Calif. K1	....	....	....	....	....	....	+10.75	+28	+7.75	+24	+4.25	+19.5	+1.75	+18.25
Indiana Harbor, Ind. Y1	....	....	....	....	....	....	1.25	+16	4.25	+12	7.75	+7.5	10.25	+6.25
Lorain, O. N3	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Sharon, Pa. S4	4.5	+24	+8.5	+34	+19.5	+44	....	....	....	....	....	....	....	....
Sharon, Pa. M6	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Sparrows Pt., Md. B2	2.5	+26	+10.5	+36	+21.5	+46	0.25	+17	3.25	+13	6.75	+8.5	9.25	+7.25
Wheatland, Pa. W9	4.5	+24	+8.5	+34	+19.5	+44	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Youngstown R2, Y1	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25

Size—Inches	1½		2		2½		3		3½		4	
List Per Ft	27.5c		37c		58.5c		76.5c		92c		$1.09	
Pounds Per Ft	2.75		3.68		5.82		7.62		9.20		10.89	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5
Alton, Ill. L1	9.75	+6.25	10.25	+5.75	11.75	+5.5	11.75	+5.5	1.25	+16.5	1.25	+16.5
Benwood, W. Va. W10	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5
Etna, Pa. N2	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5
Fairless, Pa. N3	9.75	+6.25	10.25	+5.75	11.75	+5.5	11.75	+5.5	1.25	+16.5	1.25	+16.5
Fontana, Calif. K1	+1.25	+17.25	+0.75	+16.75	0.75	+16.5	0.75	+16.5	+9.75	+27.5	+9.75	+27.5
Indiana Harbor, Ind. Y1	10.75	+5.25	11.25	+4.75	12.75	+4.5	12.75	+4.5	2.25	+15.5	2.25	+15.5
Lorain, O. N3	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	....	....	....	....
Sharon, Pa. M6	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5
Sparrows Pt., Md. B2	9.75	+6.25	10.25	+5.75	11.75	+5.5	11.75	+5.5	1.25	+16.5	1.25	+16.5
Wheatland, Pa. W9	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5
Youngstown R2, Y1	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5

*Galvanized pipe discounts based on price of zinc at 11.50c, East St. Louis.

Stainless Steel

Representative prices, cents per pound; subject to current lists of extras

AISI Type	—Rerolling— Ingot	Slabs	Forging Billets	H.R. Strip	H.R. Rods; C.F. Wire	Bars; Structural Shapes	Plates	Sheets	C.R. Strip; Flat Wire
201	22.75	25.00	....	36.00	....	43.50	39.25	48.50	45.00
202	24.75	28.25	37.75	39.00	42.25	44.50	40.00	49.25	49.25
301	24.00	26.00	38.75	37.25	43.50	46.00	41.25	51.25	47.50
302	26.25	29.50	39.50	40.50	44.25	46.75	42.25	52.00	52.00
302B	26.50	30.75	42.25	45.75	46.75	49.00	44.50	57.00	57.00
303	....	33.25	42.50	....	47.25	49.75	45.00	56.75	56.75
304	28.00	29.50	39.50	40.50	44.25	46.75	45.75	52.00	52.00
304L	....	37.25	47.25	48.25	52.00	54.50	53.50	59.75	59.75
305	29.50	34.75	44.00	47.50	47.00	49.50	46.25	58.75	58.75
308	32.00	36.25	49.00	50.25	54.75	57.75	55.25	63.00	63.00
309	41.25	47.50	60.00	64.50	66.25	69.50	66.00	80.50	80.50
310	51.50	59.50	81.00	84.25	89.75	94.50	87.75	96.75	96.75
314	....	....	80.50	....	89.75	94.50	87.75	....	104.25
316	41.25	47.50	64.50	68.50	71.75	75.75	71.75	80.75	80.75
316L	....	55.25	72.25	76.25	79.50	83.50	79.50	88.50	88.50
317	49.75	58.00	79.75	88.25	89.50	94.25	88.50	101.00	101.00
321	33.50	38.00	48.75	53.50	54.50	57.50	54.75	65.50	65.50
330	....	....	123.25	....	98.75	143.75	135.00	149.25	149.25
18-8 CbTa	38.50	48.25	57.75	63.50	63.75	67.25	64.75	79.25	79.25
403	....	....	26.75	....	29.75	31.50	30.00	40.25	40.25
405	20.25	26.50	30.75	36.00	34.75	36.50	32.50	46.75	46.75
410	17.50	19.50	26.75	31.00	29.75	31.50	30.00	40.25	40.25
416	....	....	29.75	....	33.75	35.50	31.25	48.25	48.25
420	....	31.50	35.50	41.75	40.75	42.75	40.25	62.00	62.00
430	17.75	19.75	29.75	32.00	33.75	35.50	31.00	40.75	40.75
430F	....	....	30.50	....	34.25	36.00	31.75	51.75	51.75
431	....	29.75	39.25	....	43.50	46.00	41.00	56.00	56.00
446	....	....	40.75	59.00	46.00	48.25	42.75	70.00	70.00

Producers Are: Allegheny Ludlum Steel Corp.; American Steel & Wire Div., U. S. Steel Corp.; Anchor Drawn Steel Co., division of Vanadium-Alloys Steel Co.; Armco Steel Corp.; Babcock & Wilcox Co.; Bethlehem Steel Co.; J. Bishop & Co.; A. M. Byers Co.; Calstrip Steel Corp.; G. O. Carlson Inc.; Carpenter Steel Co.; Carpenter Steel Co. of New England; Charter Wire Products; Crucible Steel Co. of America; Damascus Tube Co.; Dearborn Div., Sharon Steel Corp.; Wilbur B. Driver Co.; Driver-Harris Co.; Eastern Stainless Steel Corp.; Firth Sterling Inc.; Fort Wayne Metals Inc.; Green River Steel Corp., subsidiary of Jessop Steel Co.; Indiana Steel & Wire Co.; Ingersoll Steel Div., Borg-Warner Corp.; Ellwood Ivins Steel Tube Works Inc.; Jessop Steel Co.; Johnson Steel & Wire Co. Inc.; Stainless & Strip Div., Jones & Laughlin Steel Corp.; Josiyn Stainless Steels, division of Josiyn Mfg. & Supply Co.; Latrobe Steel Co.; Lukens Steel Co.; Maryland Fine & Specialty Wire Co. Inc.; McLouth Steel Corp.; Metal Forming Corp.; Midvale-Heppenstall Co.; National Standard Co.; National Tube Div., U. S. Steel Corp.; Pacific Tube Co.; Page Steel & Wire Div., American Chain & Cable Co. Inc.; Pittsburgh Rolling Mills Inc.; Republic Steel Corp.; Riverside-Alloy Metal Div., H. K. Porter Company Inc.; Rodney Metals Inc.; Sawhill Tubular Products Inc.; Sharon Steel Corp.; Simonds Saw & Steel Co.; Somers Brass Co.; Specialty Wire Co. Inc.; Standard Tube Co.; Superior Steel Div., Copperweld Steel Co.; Superior Tube Co.; Swepco Tube Corp.; Techalloy Co. Inc.; Timken Roller Bearing Co.; Trent Tube Co., subsidiary of Crucible Steel Co. of America; Tube Methods Inc.; Ulbrich Stainless Steels, Inc.; Union Steel Corp.; U. S. Steel Corp.; Universal Cyclops Corp.; Vanadium-Alloys Steel Co.; Wall Tube & Metal Products Co.; Wallingford Steel, subsidiary of Allegheny Ludlum Steel Corp.; Washington Steel Corp.; Seymour Mfg. Co.

Clad Steel

	Plates— Carbon Base 5%	10%	15%	20%	Sheets Carbon Base 20%
Stainless					
302	....	....	....	....	37.50
304	26.05	28.80	31.55	34.30	39.75
304L	30.50	33.75	36.95	40.15	....
316	38.20	42.20	46.25	50.25	58.25
316L	42.30	46.75	51.20	55.65	....
316 Cb	49.90	55.15	60.40	65.65	....
321	31.20	34.50	37.75	41.05	47.25
347	36.90	40.80	44.65	48.55	57.00
405	22.25	24.60	26.90	29.25	....
410	20.55	22.70	24.85	27.00	....
430	21.20	23.45	25.65	27.90	....
Inconel	49.80	61.35	72.80	84.40	....
Nickel	43.20	55.05	66.95	78.90	....
Nickel, Low Carbon	43.50	55.70	67.95	80.35	....
Monel	44.25	55.35	66.45	77.60	....

	Strip, Carbon Base —Cold Rolled— 10%	Both Sides
Copper*	36.10	43.00

*Deoxidized. Production points: Stainless-clad sheets, New Castle, Ind. I-4; stainless-clad plates, Claymont, Del. P4; Coatesville, Pa. L7; New Castle, Ind. I-4, and Washington, Pa. J3; nickel, inconel, monel-clad plates, Coatesville L7; copper-clad strip, Carnegie, Pa. S18.

Tool Steel

Grade	$ per lb	Grade	$ per lb
Reg. Carbon (W-1)	0.330	Hi-Carbon-Cr (D-11)	0.955
Spec. Carbon (W-1)	0.385	V-Cr Hot Work (H-13)	0.550
Oil Hardening (O-1)	0.505	W-Cr Hot Work (H-12)	0.530
V-Cr Hot Work (H-11)	0.505	W Hot Wk (H-21)	1.425-1.44

Grade by Analysis (%) W	Cr	V	Co	Mo	AISI Designation	$ per lb
18	4	1	....	....	T-1	1.840
18	4	2	....	....	T-2	2.005
13.5	4	3	....	....	T-3	2.105
18.25	4.25	1	4.75	....	T-4	2.545
18	4	2	9	....	T-5	2.915
20.25	4.25	1.6	12.95	....	T-6	4.330
13.75	3.75	2	5	....	T-8	2.485
1.5	4	1	....	8.5	M-1	1.200
6.4	4.5	1.9	....	5	M-2	1.345
6	4	3	....	6	M-3	1.590

Tool steel producers include: A4, A8, B2, B8, C4, C9, C12, C18, F2, J3, L3, M14, S8, U4, V2, and V3.

Pig Iron

Prices in dollars per gross ton, f.o.b. (rail) furnace; add 50 cents when shipped by truck. Maximum delivered prices are approximate and based on rail shipment.

Birmingham District	Basic	No. 2 Foundry	Malle-able	Besse-mer
Birmingham R2	62.00	62.50**	66.50	....
Birmingham U6	....	62.50**	66.50	....
Woodward,Ala. W15	62.00*	62.50**	66.50	....
Cincinnati, deld.	....	70.20	....	....
Buffalo District				
Buffalo H1, R2	66.00	66.50	67.00	67.50
N.Tonawanda,N.Y. T9	....	66.50	67.00	67.50
Tonawanda,N.Y. W12	66.00	66.50	67.00	67.50
Boston, deld.	77.29	77.79	78.29	....
Rochester,N.Y., deld.	69.02	69.52	70.02	....
Syracuse,N.Y., deld.	70.12	70.62	71.12	....
Chicago District				
Chicago I-3	66.00	66.50	66.50	67.00
S.Chicago R2	66.00	66.50	66.50	67.00
S.Chicago,Ill. W14	66.00	....	66.50	67.00
Milwaukee, deld.	68.81	69.31	69.31	69.81
Muskegon,Mich., deld.	....	74.46	74.46	....
Cleveland District				
Cleveland R2, A7	66.00	66.50	66.50	67.00
Akron,Ohio, deld.	69.52	70.02	70.02	70.52
Mid-Atlantic District				
Birdsboro,Pa. B10	68.00	68.50	69.00	69.50
Chester,Pa. P4	Nom.	Nom.	Nom.	....
Swedeland,Pa. A3	68.00	68.50	69.00	69.50
NewYork, deld.	....	75.41	75.91	....
Newark,N.J., deld.	72.53	73.03	73.53	74.03
Philadelphia, deld.	70.18	70.68	71.18	71.68
Troy,N.Y. R2	68.00	68.50	69.00	69.50
Boston, deld.	75.20	75.70	76.20	76.70
Pittsburgh District				
Nevillelsland,Pa. P6	66.00	66.50	66.50	67.00
Pittsburgh (N&S sides), deld.	....	68.31	68.31	68.81
Monaca,Pa., deld.	....	68.33	68.33	68.83
Lawrenceville,W.Homestead, Wilmerding,Pa., deld.	....	68.68	68.68	69.18
Verona,Trafford,Pa., deld.	68.83	69.33	69.33	69.83
Brackenridge,Pa., deld.	69.16	69.66	69.66	70.16
Midland,Pa. C18	66.00	....	....	....
Youngstown District				
Hubbard,Ohio Y1	....	....	66.50	....
Sharpsville,Pa. S6	66.00	....	66.50	67.00
Youngstown Y1	....	....	66.50	....

Other U. S. Districts	Basic	No. 2 Foundry	Malle-able	Besse-mer
Duluth I-3	66.00	66.50	66.50	67.00
Erie,Pa. I-3	66.00	66.50	66.50	67.00
Fontana,Calif. K1	75.00	75.50	....	....
Geneva,Utah C11	66.00	66.50	....	....
GraniteCity,Ill. G4	67.90	68.40	68.90	....
Ironton,Utah C11	66.00	66.50	....	....
Minnequa,Colo. C10	68.00	68.50	69.00	....
Rockwood,Tenn. T3	62.00	62.50‡	66.50	67.00
Toledo,Ohio I-3	66.00	66.50	66.50	67.00
Cincinnati, deld.	72.94	73.44	....	....
Mansfield,Ohio, deld.	....	....	71.34	....
Canadian District				
Hamilton,Ont. S46	65.00	65.00	65.50	....
PortColborne,Ont. A25	65.00	65.00	65.50	66.00
SaultSte.Marie,Ont. A25	65.00	65.00	65.50	66.00

*Phos. 0.70-0.90%; Phos. 0.30-0.69%, $63.
**Phos. 0.70-0.90%; Phos. 0.30-0.69%, $63.50.
‡Phos. 0.50% up; Phos. 0.30-0.49%, $63.50.

PIG IRON DIFFERENTIALS

Silicon: Add 75 cents per ton for each 0.25% Si or percentage thereof over base grade, 1.75-2.25%, except on low phos. iron on which base is 1.75-2.00%.

Manganese: Add 50 cents per ton for each 0.25% manganese over 1% or portion thereof.

BLAST FURNACE SILVERY PIG IRON, Gross Ton

(Base 6.01-6.50% silicon; add 75c for each 0.50% silicon or portion thereof over the base grade within a range of 6.50 to 13%; starting with silicon over 13% add $1 per ton for each 0.50% silicon or portion thereof up to 14%; over 14%, price is $93 with $1 differential; add $1 for each 0.50% Mn over 1%)

Buffalo H1	$79.25
Jackson,Ohio I-3, J1	78.00
PortColborne,Ont.Ont. A25	78.50
Toledo,Ohio I-3	78.00

ELECTRIC FURNACE SILVERY IRON, Gross Ton

(Base 14.01-14.50% silicon; add $1 for each 0.50% Si to 18%; $1.25 for each 0.50% Mn over 1%; $2 per gross ton premium for 0.045% max P)

CalvertCity,Ky. P15	$99.00
NiagaraFalls,N.Y. P15	99.00
Keokuk,Iowa Open-hearth & Fdry. K2	89.00
Keokuk,Iowa O.H. & Fdry, 12½ lb piglets, 16% Si, K2	92.00

LOW PHOSPHORUS IRON, Gross Ton

Birdsboro,Pa. B10 (Phos. 0.075% max)	$73.00
Lyles,Tenn. T3 (Phos. 0.035% max)	73.00
Rockwood,Tenn. T3 (Phos. 0.035% max)	73.00
Buffalo H1 (Intermediate) (0.036-0.075% max)	71.50
Cleveland A7 (Intermediate) (Phos. 0.036-0.075% max)	71.00
Duluth I-3 (Intermediate) (Phos. 0.036-0.075% max)	71.00
Erie,Pa. I-3 (Intermediate) (Phos. 0.036-0.075% max)	71.00
Nevillelsland,Pa. P6 (Intermediate) (Phos. 0.036-0.075% max)	71.00
Swedeland,Pa. A3 (Intermediate) (Phos. 0.036-0.075% max)	71.00
Troy,N.Y. R2 (Phos. 0.075% max)	73.00

Steel Service Center Products

Representative prices, cents per pound, f.o.b. warehouse, for 2000 lb orders. Prices will vary with total weight of the order. City delivery charges are 15 cents per 100 lb except: Denver, 20 cents; Baltimore, Boston, New York, Philadelphia, San Francisco, 10 cents; Atlanta, Birmingham, Dallas, Houston, Los Angeles, Seattle, no charge.

	SHEETS			STRIP	BARS			STRUCTURAL	PLATES	
	Hot Rolled	Cold Rolled	Galv.	Hot Rolled	H.R. Rounds	C.F. Rounds	H.R. Alloy 4140	SHAPES	Carbon	Floor
Atlanta	9.37	10.61	11.85	10.85	9.53	13.24	....	9.94	9.73	11.16
Baltimore	9.20	9.61	10.06	11.25	9.65	11.70	16.38	9.85	9.60	11.10
Birmingham	8.46	10.20	10.59	10.41	8.26	13.14	16.65	8.47	8.41	10.05
Boston	9.74	10.58	11.77	12.16	9.77	13.35	16.69	10.16	9.62	11.08
Buffalo	8.55	9.30	11.25	11.00	8.75	11.45	16.30	9.15	8.65	11.10
Charlotte, N. C.	10.52	11.22	10.55	11.51	10.32	12.68	....	10.53	10.47	12.11
Chicago	9.22	10.20	10.70	11.39	9.22	10.65	15.95	9.57	9.06	11.35
Cincinnati	9.34	10.26	10.75	11.71	9.33	11.53	16.27	10.14	9.44	11.68
Cleveland	9.22	10.66	10.92	11.51	9.33	11.25	16.06	9.96	9.30	11.59
Dallas	10.57	10.05	11.75	12.13	9.98	12.98	16.95	10.21	9.81	11.18
Detroit	9.48	10.46	11.05	11.76	9.53	11.01	16.23	10.14	9.43	11.61
Denver	9.41	11.77	12.11	9.86	10.10	11.47	....	10.02	9.69	11.83
Houston	10.17	9.65	11.35	11.73	9.58	13.10	16.55	9.81	9.41	10.78
Indianapolis	9.66	10.64	11.14	11.83	9.66	11.09	16.39	10.01	9.50	11.79
Kansas City	9.21	10.87	11.35	10.87	9.31	11.57	15.72	9.80	9.10	....
Los Angeles	10.35	11.20	12.10	12.40	10.25	14.20	17.35	10.45	10.30	12.30
Memphis, Tenn.	9.63	10.35	10.80	11.29	9.48	12.70	16.53	9.67	9.32	11.18
Milwaukee	9.36	10.34	10.84	11.53	9.36	10.89	16.09	9.79	9.20	11.49
Moline, Ill.	9.62	10.60	11.10	11.79	9.62	11.05	16.40	9.97	9.46	11.75
Newark, N. J.	9.36	10.13	11.35	11.46	9.74	13.25	16.40	10.20	9.51	11.05
New York	9.36	10.13	11.35	11.46	9.74	13.25	16.40	10.20	9.51	11.00
Philadelphia	9.50	10.00	10.89	11.25	9.65	11.95	16.48	9.85	8.85	11.10
Pittsburgh	9.22	10.53	11.58	11.49	9.22	11.25	16.95	8.91	9.06	11.35
Portland, Oreg.	10.40	12.25	12.35	12.40	10.40	16.65	17.85	11.00	10.55	12.70
St. Louis	9.42	10.58	11.08	11.59	9.44	11.28	16.33	9.80	9.28	11.59
St. Paul	9.57	10.24	11.39	11.74	9.57	11.49	16.54	9.92	9.41	11.70
San Francisco	10.17	11.69	11.40	11.78	10.07	15.10	18.20	10.49	10.38	12.47
Seattle	11.35	12.45	13.40	12.80	10.80	10.20	17.80	11.59	10.95	13.60
Spokane, Wash.	11.20	12.30	13.25	12.65	10.65	16.20	17.85	11.35	10.80	13.01

Specifications: Hot rolled sheet, sheared edge, 10 Ga. & 36 x 96-120 in.; cold rolled sheets, 20 Ga. & 36 x 96-120 in.; galvanized sheets, 10 Ga. x 36 x 120 in. except Los Angeles, Dallas and Houston, 10 Ga. x 48 x 120 in.; hot rolled strip, ¼ in. x 1 in.; hot rolled carbon bars, rounds, ⅜ in.—1¼ in., M1020; cold finished bars, 1 in., C1018; hot rolled alloy bars, 4140 annealed, 1⅝ in.—2⅜ in. rounds; structural shapes, I beams, 6 x 12½ in.; carbon plates, sheared, through ½ in. x 84 in.; floor plates, ¼ in. x 36 in.

Refractories

Fire Clay Brick (per 1000 pieces*)

High-Heat Duty: Ashland, Grahn, Hayward, Hitchins, Haldeman, Olive Hill, Ky., Athens, Troup, Tex., Beech Creek, Clearfield, Curwensville, Lock Haven, Lumber, Orviston, West Decatur, Winburne, Snow Shoe, Pa., Bessemer, Ala., Farber, Mexico, St. Louis, Vandalia, Mo.; Ironton, Oak Hill, Parrall, Portsmouth, Ohio, Ottawa, Ill., Stevens Pottery, Ga., Canon City, Colo., $133; Templeton, Pa., $135; Salina, Pa., $138; Niles, Ohio, $139; Cutler, Utah, $175.

Super-Duty: Ironton, Ohio, Vandalia, Mo., Olive Hill, Ky., Clearfield, Salina, Winburne, Snow Shoe, Pa., New Savage, Md., St. Louis, $200; Stevens Pottery, Ga., $210.

Silica Brick (per 1000 pieces*)

Standard: Alexandria, Claysburg, Mt. Union, Sproul, Pa., Ensley, Ala., Pt. Matilda, Pa., Portsmouth, Ohio, Hawstone, Pa., St. Louis, $158; Warren, Niles, Windham, Ohio, Hays, Latrobe, Morrisville, Pa., $163; E. Chicago, Ind., Joliet, Rockdale, Ill., $168; Canon City, Colo., $173; Lehi, Utah, $183; Los Angeles, $185.

Semisilica Brick (per 1000 pieces*)

Woodbridge, N. J., Canon City, Colo., $133; Philadelphia, Clearfield, Pa., $138.

Ladle Brick (per 1000 pieces*)

Dry-Pressed: Alsey, Ill., Chester, New Cumberland, W. Va., Freeport, Johnstown, Merrill Station, Pa., Vandalia, Mo., New Salisbury, Ohio, $97; Vanport, Pa., Wellsville, Irondale, Ohio, $100; Clearfield, Pa., Portsmouth, Ohio, $102; St. Louis, Mexico, Mo., $120.

High-Alumina Brick (per 1000 pieces*)

50 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., Danville, Ill., $250; Philadelphia, $265; Clearfield, Pa., $230; Orviston, Snow Shoe, Pa., $260.

60 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $310; Danville, Ill., $313; Clearfield, Orviston, Snow Shoe, Pa., $320; Philadelphia, $325.

70 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $350; Danville, Ill., $353; Clearfield, Orviston, Snow Shoe, Pa., $360; Philadelphia, $365.

Sleeves (per 1000)

St. Louis, $193; Reesdale, Johnstown, Bridgeburg, St. Charles, Pa., $188; Ottawa, Ill., $205.

Nozzles (per 1000)

Reesdale, Johnstown, Bridgeburg, St. Charles, Pa., St. Louis, $310.

Runners (per 1000)

Reesdale, Johnstown, Bridgeburg, St. Charles, Clearfield, Pa., $234.

Dolomite (per net ton)

Domestic, dead-burned bulk, Billmeyer, Blue Bell, Williams, Plymouth Meeting, York, Pa., Millville, W. Va., Bettsville, Millersville, Martin, Woodville, Gibsonburg, Narlo, Ohio, $16.75; Thornton, McCook, Ill., $17; Dolly Siding, Bonne Terre, Mo., $15.00.

Magnesite (per net ton)

Domestic, dead-burned, ½ in. grains with fines: Chewelah, Wash., Luning, Nev., $46; ⅝ in. grains with fines: Baltimore (periclase), $73; Pascagoula, Miss. (periclase), $90.

*—9 in. x 4½ x 2.50 straights.

Electrodes

Threaded with nipple; unboxed, f.o.b. plant

GRAPHITE

——Inches—— Diam	Length	Per 100 lb
2	24	$64.00
2½	30	41.50
3	40	39.25
4	40	37.00
5½	40	36.50
6	60	33.25
7	60	29.75
8, 9, 10	60	29.50
12	72	28.25
14	60	28.25
16	72	27.25
17	60	27.25
18	72	27.00
20	72	26.50
24	84	27.25

CARBON

8	60	14.25
10	60	13.80
12	60	14.75
14	60	14.75
14	72	12.55
17	60	12.65
17	72	12.10
20	90	11.55
24	72, 84	11.95
24	96	12.10
30	84	12.00
35, 40	110	11.60
40	100	12.50

Canadian Steel

(Cents per lb, f.o.b. mill, except as otherwise noted)

Billets, Blooms & Slabs:
Carbon (N.T.):
Forging $97.00
Rerolling 78.00
Alloy (N.T.) 115.00

Wire Rods:
Carbon 5.70
Alloy 6.40

Wire (carload lots):
Merchant annealed . 8.40
Low carbon indus. . 7.20
Upholstery spring .. 8.55
M.B. spring 8.85

Bars & Small Shapes:
Carbon, merchant .. 5.30
Carbon, special 5.85
Alloy 6.40

Bar Mill Brands:
Carbon 5.40
Alloy 8.05

Bars, Reinforcing 5.30

Structural Shapes:
Standard carbon ... 5.50
Angles & zees 5.40

Plates, Carbon:
Sheared 5.45
Universal mill 5.10

Fluorspar

Metallurgical grades, f.o.b. shipping point in Ill., Ky., net tons, carloads, effective CaF_2 content 72.5%, $37-$41; 70%, $36-$40; 60% $33-$36.50. Imported, net ton, f.o.b. cars point of entry, duty paid, metallurgical grade; European, $30-$33, contract; Mexican, all rail, duty paid, $28-$28.50; barge, Brownsville, Tex., $30-$31.

Metal Powder

(Per pound f.o.b. shipping point in ton lots for minus 100 mesh, except as noted.)

	Cents
Sponge Iron, domestic and foreign, 98% Fe, min. trucklots, freight allowed east of Mississippi River:	
100 mesh, bags	11.50
100 mesh, pails	9.85§
40 mesh, bags	8.10††
Electrolytic Iron,	
Melting stock, 99.9% Fe, irreg. fragments, ⅛ in. x 1.3 in.	28.75
(In contract lots of 750 tons price is 22.75c.)	
Annealed, 99.5% Fe.	36.75, ton deld. east of Mississippi.
Unannealed (99+% Fe)	33.0
Unannealed (99+% Fe) (minus 325 mesh) ..	58.0
Carbonyl Iron: 90-99.9%, 3 to 20 microns, depending on grade, $8.00-700.00 in standard 200-lb containers; all minus 200 mesh.	
Aluminum: Atomized, 600-lb drum freight allowed, c.l. 39.80; ton lots	41.80
Brass, 80/20, leaded (60 mesh)	*37.00*
Bronze powder, 90/10	*54.10*
Copper, all types	15.00*
Lead	7.50*
Manganese, 500 lb and up	*25.00**
Nickel, all types ...	0.78-1.06
Nickel-Silver	*58.50*
Solder	7.00*
Stainless Steel, 304 ...	89.00
Stainless Steel, 316 ...	$1.07
Steel, AISI 4650	32.00
Tin	14.00*
Zinc	23.20
Cobalt:	Dollars
98.5%, minus 100-300 mesh ..	1.57-1.58
99.5%, below 5 microns	2.32
Molybdenum	4.35

*Plus cost of metal. †Depending on mesh. §Cutting and scarfing grades. **Depending on price of ore. ††Welding grade.

Imported Steel

(Base per 100 lb, landed, duty paid; based on current ocean rates with any rise for buyer's acc't. Source of shipment: Western Europe)

	North Atlantic	Great Lakes	South Atlantic	Gulf Coast	West Coast
Deformed Bars, Intermediate, ASTM-A 305 ...	$5.80	$6.05	$5.75	$5.65	$5.95
Bar Size Angles	5.85	6.10	5.80	5.70	6.00
Structural Angles	5.75	6.00	5.70	5.60	5.90
I-Beams	5.70	5.95	5.65	5.55	5.85
Channels	5.70	5.95	5.65	5.55	5.85
Plates (basic bessemer)	5.45	5.80	5.50	5.40	5.70
Sheets, hot rolled and galvanized	Nom.	....	Nom.	Nom.	Nom.
Furring Channels, C.R., 1000 ft, ⅞ x 0.30 lb per ft	25.20	24.70	24.40	24.40	25.20
Barbed Wire (†)	6.35	6.25	6.25	6.10	6.45
Merchant Bars	5.85	6.10	5.80	5.70	6.00
Hot-Rolled Bands	5.95	6.20	5.90	5.80	6.10
Wire Rods, Thomas No. 5 (Niederrhein)	5.80	5.85	5.75	5.75	6.00
Wire Rods, O.H., No. 5 (Niederrhein)	6.00	6.06	5.95	5.95	6.25
Bright Common Wire Nails (§)	6.80	7.05	6.75	6.65	6.95

†Per 82 lb net reel. §Per 100-lb keg, 20d nails and heavier.

Ores

Lake Superior Iron Ore

(Prices effective for the 1961 shipping season, subject to later revision, gross ton, 51.50% iron natural, rail of vessel, lower lake ports.)

Mesabi nonbessemer	$11.45
Mesabi bessemer	11.60
Old Range nonbessemer	11.70
Old Range bessemer	11.85
Open-hearth lump	12.70
High phos.	11.45

Based on upper lake rail freight rates, lake vessel freight rates, handling and unloading charges, and taxes thereon, which were in effect Jan. 1, 1961; increases or decreases after that date are absorbed by the seller.

Eastern Local Iron Ore

New Jersey, concentrates ..... nom.

Foreign Iron Ore

Cents per unit

Swedish basic, 65%, c.i.f. Atlantic ports	25.00†
Chilean, 62-65%, c.i.f. Atlantic ports ...	22.00
Brazilian, (lump) 68.5%, f.o.b. vessel, Victoria, per ton	$11.50

Tungsten Ore

Net ton, unit

Foreign wolframite, good commercial quality	$15.50-16.00*
Domestic, concentrates, f.o.b. milling points	22.00-23.00

Manganese Ore

Mn 46-48%, Indian, 85-90c, nom. per long ton unit, c.i.f. U. S. ports, duty for buyer's account.

Chrome Ore

Gross ton, f.o.b. cars New York, Philadelphia, Baltimore, Charleston, S. C., plus ocean freight differential for delivery to Portland, Oreg., Tacoma, Wash.

Indian and Rhodesian

48% 3:1	$34.00-35.00†
48% no ratio	25.00-26.00†

South African Transvaal

44% no ratio	18.75
48% no ratio	24.00-26.00†

Turkish

48% 3:1	35.00-37.00†

Domestic

Rail nearest seller

18% 3:1	30.00

Molybdenum

Sulfide concentrate, per lb of Mo content, mines, unpacked $1.23

Antimony Ore

Per short ton unit of Sb content, c.i.f. seaboard

55-60%	$3.00-3.50
60-65%	3.60-4.00

Vanadium Ore

Cents per lb V_2O_5

Domestic	31.00

*Before duty. †Nominal.

Metallurgical Coke

Price per net ton

Beehive Ovens

Connellsville, Pa., furnace	$14.75-15.25
Connellsville, Pa., foundry	18.00-18.50

Oven Foundry

Birmingham, ovens	$30.35
Cincinnati, deld.	33.34
Buffalo, ovens	32.00
Chattanooga, Tenn., ovens	30.80
Detroit, ovens	32.00
Pontiac, Mich., deld.	34.95
Saginaw, Mich., deld.	35.63
Erie, Pa., ovens	32.00
Indianapolis, ovens	31.25
Ironton, Ohio, ovens	30.50
Cincinnati, deld.	33.64
Kearny, N. J., ovens	31.25
Milwaukee, ovens	32.00
Neville Island (Pittsburgh), Pa., ovens..	30.75
New Haven, Conn., ovens	31.00
Painesville, Ohio, ovens	32.00
Cleveland, deld.	34.45
Philadelphia, ovens	31.00
St. Louis, ovens	33.00
St. Paul, ovens	31.25
Chicago, deld.	34.78
Swedeland, Pa., ovens	31.00
Terre Haute, Ind., ovens	31.25

Coal Chemicals

(Representative prices)

Cents per gal f.o.b. tank cars or tank trucks, plant.

Pure benzene	34.00
Xylene, industrial grade	29.00
Creosote	24.00
Naphthalene, 78 deg.	6.00
Toluene, one deg. (deld. east of Rockies)	25.00

Cents per lb, f.o.b. tank cars or tank trucks, deld.

Phenol, 90 per cent grade	14.75

Per ton bulk, f.o.b. cars or trucks, plant.

Ammonium sulfate, regular grade	$32.00

Huge Open Hearth Lighted

Granite City Steel Co., Granite City, Ill., has put into operation an enlarged open hearth furnace with a capacity of 600 tons per heat.

It is one of the largest steelmaking furnaces in the U. S. One heat yields about 450 tons of flat rolled plates and sheets.

About 700 tons of raw materials are required to produce one heat. The platter shaped bottom of the furnace holds a bath of molten metal that is 3 ft 9 in. deep inside a hearth that is 66 ft long and 20 ft 9 in. wide. The refining process is accelerated by lowering three lances from the furnace roof and jetting oxygen through water cooled tubes just above the molten bath.

Pig Iron . . .

Pig Iron Prices, Page 172

Merchant pig iron business is a shade better than it was a month ago, but over-all demand is spotty. The flow of iron to steelmaking furnaces continues to increase as ingot production maintains its steady rise.

In an unusual development, Hanna Furnace Corp. will halt all pig iron production at its Buffalo plant May 19 for seven weeks. The plant has been operating one of its four blast furnaces. The firm has a sizable inventory of merchant iron and will serve its customers from its reserve stocks during the shutdown.

Tonawanda Iron Div., American Radiator & Standard Sanitary Corp., has blown in its blast furnace at Tonawanda, N. Y., after a shutdown since January. The unit produces about 400 tons of pig iron per day.

The first export shipment of pig iron to be recorded at the Port of Buffalo is enroute to Tokyo. It was loaded at the Tonawanda plant of Wickwire Spencer Div., Colorado Fuel & Iron Corp. The cargo, more than 3000 tons of iron, was carried aboard the Canadian-flag freighter *Avondale* for reloading at Sorel, Que., aboard an ocean going vessel.

Sales and service activities in the merchant iron market are being stepped up by the American Steel & Wire Div., Cleveland, of U. S. Steel Corp. It has a substantial amount of merchant pig iron capacity over peak commitments to meet customer demands.

The division has added two representatives to its pig iron sales staff and has realigned sales territories, reports F. J. Woodburn, manager of merchant pig iron sales.

Stanley W. Lucas has been named to cover northwestern Ohio, Michigan, and Indiana; Charles W. Haas will cover sales in the eastern half of Pennsylvania, the eastern portion of southern New York, Maryland and Virginia, and New England. T. D. Brown, who previously covered northwestern Ohio, Michigan, and Indiana, has been reassigned to cover the lower portion of Wisconsin and the upper portion of Illinois.

Tool Steel . . .

Tool Steel Prices, Page 171

Shipments of tool steel (excluding hollow drill steel) in March totaled 6528 net tons, reports the American Iron & Steel Institute. That compares with 5751 tons in the preceding month, and 10,362 in March, 1960. The movement in the first quarter this year amounted to 18,428 tons, off sharply from the 29,619 moved in the same period of 1960.

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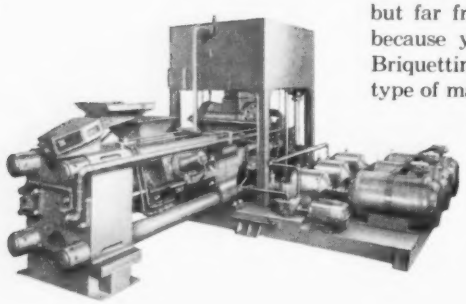

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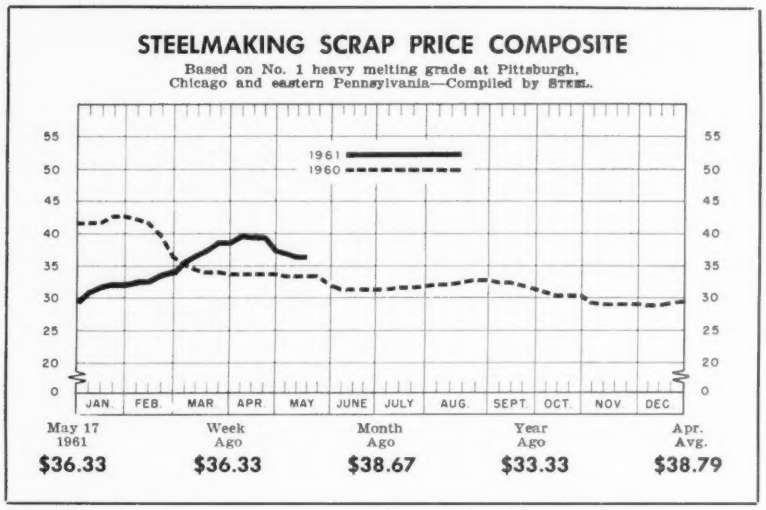


Scrap Price Composite Holds Steady

Levels off at $36.33 following five consecutive weekly declines from $39.67 at beginning of April. Export market is slightly weaker despite more buying interest

Scrap Prices, Page 178

● **Chicago**—Scrap is moving slowly here. Most prices are nominal since there isn't enough material being moved to test the market. One broker says the only grades he has been able to sell lately have been dealer bundles and railroad steel.

● **Philadelphia** — Domestic scrap prices are unchanged except for a $1 drop on couplers, springs, and wheels to $43, delivered. Export buying is more active, although at prices not as strong as they were two or three weeks ago. Domestic trading is spotty.

● **Youngstown** — A third district steel producer (Republic) at Warren, Ohio, has ordered some No. 1 heavy melting scrap at $38.50 per gross ton, up 50 cents from the price paid earlier this month by two other producers for industrial grade scrap.

● **New York**—Scrap brokers' buying prices continue steady. The market is deriving its main support from export business. Apart from buying of cast material by pipe foundries, demand from domestic consumers is light.

● **Pittsburgh**—Demand for scrap in the Valley is keeping a floor under the market, despite negligible consumer buying here. Export demand is having little impact because Philadelphia prices aren't high enough above the Pittsburgh market to make it worthwhile for dealers to ship to the seaboard—even on the reduced rate in effect. They would have to get $2 to $3 more per ton, delivered Philadelphia, to make as much as they do selling locally. Brokers' bids on Pennsylvania Railroad scrap were off $2 to $3 a ton from last month's levels.

● **Detroit**—Activity in the scrap market here is confined chiefly to a few shipments of mixed cast and some bundles to Canada. Brokers and dealers feel that the momentary softness in the market is the result of a delay in export orders from Japan. Consensus is that prices will not move until the foreign order situation firms up.

● **Buffalo**—An easier price tone has developed in the scrap market here. Dealers find it easier to buy material, but demand from consumers lags. The outlook points to some downward revision in prices unless mills start buying more actively in line with their higher operating rates.

● **Cincinnati**—The market is quiet, and brokers' buying prices are unchanged. An undertone of strength has developed, however, despite a lack of new buying. The trade believes the market has bottomed out and expects an uptrend toward the end of the month.

● **St. Louis**—The scrap market continues dull with one mill entirely out of the market. Prices are unchanged. A pickup in activity and some price improvement may come in a month or so.

● **Birmingham** — No changes in scrap prices were recorded here last week. One broker-dealer says: "There is a squeeze play on between sellers and buyers over price." Dealers are generally holding on to present stocks in an effort to move the price level higher; some mills are not buying, hoping for lower priced offerings.

● **Houston**—Prices on major steelmaking grades are off $1 to $4 a ton. No. 1 heavy melting is quoted $35 a ton, down $3 to $4; No. 2 heavy melting, $31-$32, off $4. Cast scrap is holding steady, but activity is light.

No. 1 heavy melting is being exported at $38-$38.50 from New Orleans and Baton Rouge, La., No. 2 heavy melting at $34-$34.50.

● **San Francisco**—The present steel scrap price is barely holding its own. There's a note of weakness, and some observers look for a decline in the top grades of about $1 a ton shortly.

● **Los Angeles**—The scrap market is weak, and export demand is down considerably. Export prices are: No. 1 heavy melting, $40-$42; No. 2 heavy melting, $37-$39. The domestic price on No. 1 cupola declined to $44-$47.

● **Seattle**—Some scrap dealers sense a slightly weaker price tone, possibly in sympathy with the recent tendency in the East. However, they claim the strongest market in

(*Please turn to Page* 183)

Iron and Steel Scrap

Consumer prices per gross ton, except as otherwise noted, including brokers' commission, as reported to STEEL, May 17, 1961. *Changes shown in italics.*

STEELMAKING SCRAP COMPOSITE

May 17	$36.33
May 10	36.33
Apr. Avg.	38.79
May 1960	33.07
May 1956	50.34

Based on No. 1 heavy melting grade at Pittsburgh, Chicago, and eastern Pennsylvania.

PITTSBURGH

No. 1 heavy melting	34.00-35.00
No. 2 heavy melting	28.00-29.00
No. 1 dealer bundles	34.00-35.00
No. 2 bundles	*24.00-25.00*
No. 1 busheling	34.00-35.00
No. 1 factory bundles	41.00-42.00
Machine shop turnings	*13.00-14.00*
Mixed borings, turnings	*13.00-14.00*
Short turnings	*16.00-17.00*
Cast iron borings	*15.00-16.00*
Cut structurals:	
2 ft and under	39.00-40.00
3 ft and under	38.00-39.00
Heavy turnings	27.00-28.00
Punchings & plate scrap	41.00-42.00
Electric furnace bundles	43.00-44.00

Cast Iron Grades (F.o.b. shipping point)

No. 1 cupola	*35.00-36.00*
Stove plate	*35.00-36.00*
Unstripped motor blocks	*25.00-26.00*
Clean auto cast	*35.00-36.00*
Drop broken machinery	45.00-46.00§

Railroad Scrap

No. 1 R.R. heavy melt.	37.00-38.00
Rails, 2 ft and under	*49.00-50.00*
Rails, 18 in. and under	51.00-52.00
Random rails	46.00-47.00
Angles, splice bars	45.00-46.00
Railroad specialties	41.00-42.00
Rails, rerolling	57.00-58.00

Stainless Steel Scrap

18-8 bundles & solids	180.00-185.00
18-8 turnings	105.00-110.00
430 bundles & solids	90.00-95.00
430 turnings	50.00-55.00

CHICAGO

No. 1 hvy melt., indus.	36.00-37.00
No. 1 hvy melt., dealer	34.00-35.00
No. 2 hvy melting	*28.00-29.00*
No. 1 factory bundles	39.00-40.00
No. 1 dealer bundles	36.00-37.00
No. 2 bundles	22.00-23.00
No. 1 busheling, indus.	36.00-37.00
No. 1 busheling, dealer	34.00-35.00
Machine shop turnings	15.00-16.00
Mixed borings, turnings	17.00-18.00
Shovel turnings	17.00-18.00
Cast iron borings	17.00-18.00
Cut structurals, 3 ft	39.00-40.00
Punchings & plate scrap	40.00-41.00

Cast Iron Grades

No. 1 cupola	41.00-42.00
Stove plate	36.00-37.00
Unstripped motor blocks	33.00-34.00
Clean auto cast	46.00-47.00
Drop broken machinery	46.00-47.00

Railroad Scrap

No. 1 R.R. heavy melt.	38.00-39.00
R.R. malleable	46.00-47.00
Rails, 2 ft and under	48.00-49.00
Rails, 18 in. and under	49.00-50.00
Angles, splice bars	41.00-42.00
Axles	57.00-58.00
Rails, rerolling	57.00-58.00

Stainless Steel Scrap

18-8 bundles, solids	180.00-185.00
18-8 turnings	105.00-110.00
430 bundles & solids	90.00-95.00
430 turnings	50.00-55.00

BUFFALO

No. 1 heavy melting	31.00-32.00
No. 2 heavy melting	26.00-27.00
No. 1 bundles	31.00-32.00
No. 2 bundles	24.00-25.00
No. 1 busheling	31.00-32.00
Shovel turnings	17.00-18.00
Machine shop turnings	13.00-14.00
Cast iron borings	15.00-16.00
Low phos. structurals and plates, 2 ft and under	39.00-40.00

Cast Iron Grades (F.o.b. shipping point)

No. 1 cupola	38.00-39.00
No. 1 machinery	45.00-46.00

Railroad Scrap

Rails, random lengths	42.00-43.00
Rails, 3 ft and under	48.00-49.00
Rails, rerolling	61.00-62.00
Railroad specialties	41.00-42.00

CLEVELAND

No. 1 heavy melting	*34.00-35.00*
No. 1 heavy melting	24.00-25.00†
No. 1 factory bundles	38.00-39.00
No. 1 bundles	*34.00-35.00*
No. 2 bundles	23.00-24.00†
No. 1 busheling	*34.00-35.00*
Machine shop turnings	12.00-13.00
Shovel turnings	16.00-17.00
Mixed borings, turnings	16.00-17.00
Cast iron borings	16.00-17.00
Cut foundry steel	30.00-33.00
Cut structurals, plate, 2 ft and under	38.00-39.00
Low phos, punchings & plate	*35.00-36.00*
Alloy free, short shovel turnings	18.00-19.00
Electric furnace bundles	35.00-36.00

Cast Iron Grades

No. 1 cupola	39.00-40.00
Charging box cast	26.00-27.00
Heavy breakable cast	28.00-29.00
Stove plate	36.00-37.00
Unstripped motor blocks	31.00-32.00
Brake shoes	37.00-38.00
Clean auto cast	45.00-46.00
Burnt cast	32.00-33.00
Drop broken machinery	46.00-47.00

Railroad Scrap

R.R. malleable	47.00-48.00
Rails, 2 ft and under	47.00-48.00
Rails, random lengths	44.00-45.00
Rails, 18 in. and under	48.00-49.00
Cast steel	39.00-40.00
No 1 railroad cast	48.00-49.00
Railroad specialties	41.00-42.00
Angles, splice bars	43.50-44.50
Rails, rerolling	53.00-54.00

Stainless Steel Scrap (Brokers' buying prices; f.o.b. shipping point)

18-8 bundles, solids	155.00-160.00
18-8 turnings	70.00-75.00
430 clips, bundles, solids	70.00-75.00
430 turnings	15.00-25.00

YOUNGSTOWN

No. 1 heavy melting	*37.00-38.00*
No. 2 heavy melting	25.00-26.00†
No. 1 busheling	*37.00-38.00*
No. 1 bundles	*37.00-38.00*
No. 2 bundles	25.00-26.00†
Machine shop turnings	14.00-15.00†
Shovel turnings	19.00-20.00†
Cast iron borings	19.00-20.00†
Low phos.	*38.00-39.00*
Electric furnace bundles	38.00-39.00

Railroad Scrap

No. 1 R.R. heavy melt.	*38.00-39.00*

CINCINNATI

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	30.00-31.00
No. 2 heavy melting	27.50-28.50
No. 1 bundles	31.00-32.00
No. 2 bundles	19.00-20.00
No. 1 busheling	30.00-31.00
Machine shop turnings	9.00-10.00
Mixed borings, turnings	11.00-12.00
Shovel turnings	12.00-13.00
Cast iron borings	11.00-12.00
Low phos. 18 in.	38.00-39.00

Cast Iron Grades

No. 1 cupola	34.00-35.00
Heavy breakable cast	28.00-29.00
Charging box cast	34.00-35.00
Drop broken machinery	46.00-47.00

Railroad Scrap

No. 1 R.R. heavy melt.	33.00-34.00
Rails, 18 in. and under	46.00-47.00
Rails, random lengths	40.00-41.00

ST. LOUIS (Brokers' buying prices)

No. 1 heavy melting	34.00
No. 2 heavy melting	28.00
No. 1 bundles	34.00
No. 2 bundles	24.00
No. 1 busheling	34.00
Machine shop turnings	13.00
Shovel turnings	16.00

Cast Iron Grades

No. 1 cupola	38.00
Charging box cast	34.00
Heavy breakable cast	32.00
Unstripped motor blocks	34.00
Clean auto cast	38.00
Stove plate	33.00

Railroad Scrap

No. 1 R.R. heavy melt.	34.00
Rails, random lengths	37.00
Rails, rerolling	52.00-53.00
Rails, 18 in. and under	43.00
Angles, splice bars	40.00†

PHILADELPHIA

No. 1 heavy melting	38.00-40.00
No. 2 heavy melting	34.00-35.00
No. 1 bundles	42.00
No. 2 bundles	24.00
No. 1 busheling	41.00-42.00
Electric furnace bundles	43.00
Mixed borings, turnings	17.00†
Shovel turnings	20.00
Machine shop turnings	14.00
Heavy turnings	25.00†
Structurals & plates	43.00-44.00
Couplers, springs, wheels	*43.00*
Rail crops, 2 ft & under	52.00-54.00

Cast Iron Grades

No. 1 cupola	40.00
Heavy breakable cast	40.00
Drop broken machinery	49.00-50.00†
Malleable	49.00†

NEW YORK (Brokers' buying prices)

No. 1 heavy melting	30.00-31.00
No. 2 heavy melting	23.00-24.00
No. 1 bundles	30.00-31.00
No. 2 bundles	20.00-21.00
Machine shop turnings	5.50-6.00†
Mixed borings, turnings	6.00-6.50†
Shovel turnings	7.00-8.00†
Low phos. structural & plates	32.00-33.00

Cast Iron Grades

No. 1 cupola	34.00-35.00
Unstripped motor blocks	25.00-26.00
Heavy breakable	31.00-32.00

Stainless Steel

18-8 sheets, clips, solids	155.00-160.00
18-8 borings, turnings	70.00-75.00
410 sheets, clips, solids	40.00-45.00
430 sheets, clips, solids	55.00-60.00

BOSTON

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	28.50-29.00
No. 2 heavy melting	25.00-26.00
No. 1 bundles	28.00-29.00
No. 1 busheling	28.50-29.00
Machine shop turnings	5.00-6.00
Shovel turnings	9.00-9.50
No. 1 cast	39.00-40.00
Mixed cupola cast	32.00-33.00
No. 1 machinery cast	40.00-42.00

DETROIT (Brokers' buying prices)

No. 1 heavy melting	27.00-28.00
No. 2 heavy melting	21.00-22.00
No. 1 bundles	30.00-31.00
No. 2 bundles	19.00-20.00
No. 1 busheling	27.00-28.00
Machine shop turnings	8.00-9.00
Mixed borings, turnings	9.00-10.00
Shovel turnings	10.00-11.00

Cast Iron Grades

No. 1 cupola	31.00-32.00
Mixed cast	29.00-30.00
Stove plate	25.00-26.00
Heavy breakable	24.00-25.00
Unstripped motor blocks	22.00-23.00
Clean auto cast	37.00-38.00

Stainless Steel Scrap

18-8 bundles & solids	165.00-170.00
18-8 turnings	65.00-70.00
430 bundles & solids	65.00-70.00
430 turnings	15.00-20.00†

BIRMINGHAM

No. 1 heavy melting	32.00-33.00
No. 2 heavy melting	27.00-28.00
No. 1 bundles	32.00-33.00
No. 2 bundles	19.00-20.00
No. 1 busheling	32.00-33.00
Cast iron borings	10.00-11.00
Machine shop turnings	18.00-19.00
Shovel turnings	21.00-22.00
Bar crops and plates	42.00-43.00
Structurals & plate	41.00-42.00
Electric furnace bundles	36.00-37.00
Electric furnace:	
3 ft and under	34.00-35.00
2 ft and under	35.00-36.00

Cast Iron Grades

No. 1 cupola	42.00-43.00
Stove plate	42.00-43.00
Unstripped motor blocks	31.00-32.00
No. 1 wheels	35.00-36.00

Railroad Scrap

No. 1 R.R. heavy melt.	33.00-34.00
Rails, 18 in. and under	44.00-45.00
Rails, random lengths	40.50-41.50
Angles, splice bars	42.00-43.00

HOUSTON

(Brokers' buying prices; f.o.b. car)

No. 1 heavy melting	*35.00*
No. 2 heavy melting	*31.00-32.00*
No. 1 bundles	*34.00-35.00*
No. 2 bundles	*24.00*
Machine shop turnings	*11.00-12.00*
Low phos. plate & structurals:	
3 ft	*40.00*
2 ft and under	44.00-45.00

Cast Iron Grades

No. 1 cupola	37.00-38.00
Heavy breakable	26.00-27.00
Foundry malleable	30.00-31.00
Unstripped motor blocks	31.00-32.00

Railroad Scrap

R.R. heavy melt. (3 ft)	43.00

LOS ANGELES

No. 1 heavy melting	38.00-40.00
No. 1 hvy melt (export)	*40.00-42.00*
No. 2 heavy melting	34.00-37.00
No. 2 hvy melt (export)	*37.00-39.00*
No. 1 bundles	30.00-31.00
No. 2 bundles	25.00
No. 2 bundles (export)	27.00-28.00
Machine shop turnings	15.00-17.00
Shovel turnings	15.00-17.00
Cast iron borings	16.00-17.00
Cut structurals and plate 1 ft and under	52.00

Cast Iron Grades

No. 1 cupola	*44.00-47.00*

Railroad Scrap

No. 1 R.R. heavy melt.	42.00

PORTLAND, OREG.

(Prepared, f.o.b. car)

No. 1 heavy melting	44.00-45.00
No. 2 heavy melting	41.00
No. 2 bundles	31.00
Shovel turnings	16.00-18.00
Electric furnace bundles	52.00

Cast Iron Grades

No. 1 cupola	40.00-42.00
Heavy breakable	37.00
Unstripped motor blocks	39.00
Stove plate (f.o.b. plant)	37.00

SEATTLE (Prepared, f.o.b. car)

No. 1 heavy melting	44.00
No. 1 hvy (unprepared)	39.00
No. 2 heavy melting	41.00
No. 2 hvy (unprepared)	36.00
No. 2 bundles	31.00
Shovel turnings	16.00
Electric furnace bundles	50.00

Cast Iron Grades

No. 1 cupola	42.00
Heavy breakable cast	39.00
Unstripped motor blocks	39.00-40.00
Stove plate (f.o.b. plant)	37.00

SAN FRANCISCO

No. 1 heavy melting	41.00**
No. 2 heavy melting	38.00**
No. 1 bundles	34.00**
No. 2 bundles	27.00**
Machine shop turnings	18.00**
Mixed borings, turnings	18.00**
Cast iron borings	18.00**
Heavy turnings	18.00**
Shovel turnings	18.00**
Cut structurals, 3 ft	44.00

Cast Iron Grades

No. 1 cupola	48.00
Charging box cast	34.00
Stove plates	34.00
Heavy breakable cast	28.00
Unstripped motor blocks	31.00
Clean auto cast	40.00
Drop broken machinery	45.00-46.00
No. 1 wheels	34.00

HAMILTON, ONT.

(Brokers' buying prices; net tons)

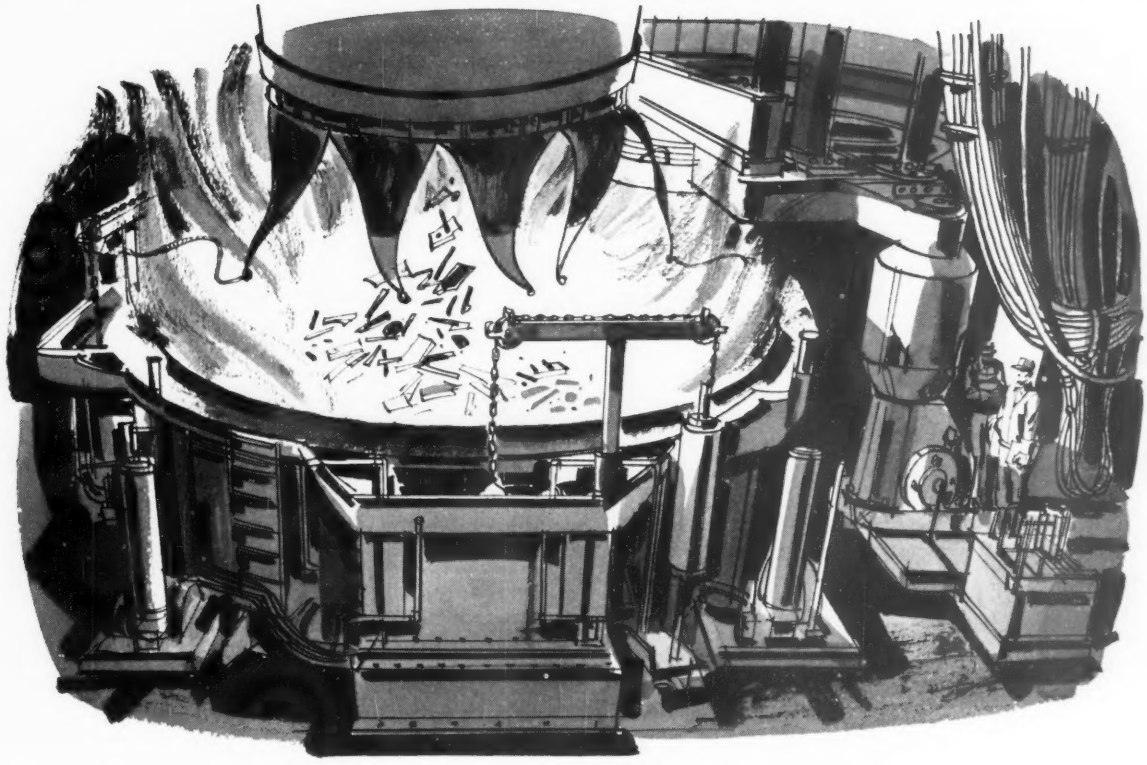
No. 1 heavy melting	31.00
No. 2 hvy melt, 2 ft & under	29.00
No. 1 bundles	31.00
No. 2 bundles	21.00
Mixed steel scrap	23.00
Mixed borings, turnings	12.00
Busheling, new factory: Prepared	31.00
Unprepared	25.00
Shovel turnings	12.00

Cast Iron Grades‡

No. 1 machinery cast	32.00

*For export add $4 dock charge.
**Based mainly on export sales.
†Nominal.
‡F.o.b. Hamilton, Ont.
§Delivered.

DANGEROUS INTRUDERS IN IRON AND STEEL SCRAP



COPPER . . . FRIEND OR FOE?

Because it is one of the most adaptable of metals, copper can be used either in its pure state or as an alloy with a wide variety of other metals.

The steel industry values copper as an element in certain steel compositions because it acts as a strengthening agent. Its presence also increases the resistance of steel to the harmful effects of atmospheric corrosion. These qualities make copper an important element in the weight-saving, high strength low alloy steels. For such steels, copper is a friend.

However, if copper enters the furnace as an unknown part of the charge, it becomes an undesired residual element. It will alloy with the molten metal, making the finished steel unfit for its intended use. In certain ranges of composition, it will impair the response of steel to fabrication by hot working or deep drawing. In the electric furnace, it is particularly undesirable. The presence of this non-oxidizable element may make it necessary to divert, or possibly force the scrapping of the entire heat.

When any of these situations occur, copper is a definite foe.

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Copper Price Could Rise Further

Nonferrous Metal Prices, Pages 182 & 183

PREDICTIONS that the primary price of copper may rise to 33 cents a pound before the bullish streak dominating the market subsides are being made by coppermen.

This may not be immediate and it may just be applicable to the custom smelter quotation, but the trend is in this direction. The tipoff may be whether producers announce stepped up production or not. This is the safety valve.

Last week, the copper price was advanced to 31 cents a pound (May 15)—the second 1 cent hike in two weeks. Unlike the previous boost, initiated by a custom smelter, the latest was sparked by Anaconda Co.

• **A Paradox** — From a business point of view, conditions are hardly good enough to justify this much price bullishness. Customers are doing more business and consequently ordering more copper (for current needs and to replenish inventory) but brass mills report, for instance, that while their business is up (considerably in some cases) it's not booming (see Page 75).

Statistically too, the copper picture is brighter, but again not enough to justify the current strength of the market. For example, U. S. deliveries to fabricators in April increased 13,000 tons to 125,905 tons (see chart). Refined production, at the same time, fell to 128,550 tons and producers' stocks declined by 25,000 tons to 114,247 tons. Significant: Total Free World producers' stocks (447,398 tons) are still at a much higher than normal level.

It was just a few months ago that forecasters were predicting a large copper surplus in 1961 with resultant price weakness.

• **Behind Copper's Strength**—Why then the upturn? Simply put, it's as much a psychological as a physical matter. Threats of major disruptions in supply exist:

1. Violence in the Congo continues to pose a threat to the Katanga mines, which turn out about 8 per cent of the Free World's copper.

2. Both the Congo turmoil and the threat of widespread trouble in the Union of South Africa could spill over into the lush copper fields of Northern Rhodesia where about 17 per cent of the Free World's copper is mined.

3. A strike could occur at Kennecott Copper Corp.'s properties (and some smaller mines) at the end of June when labor contracts expire.

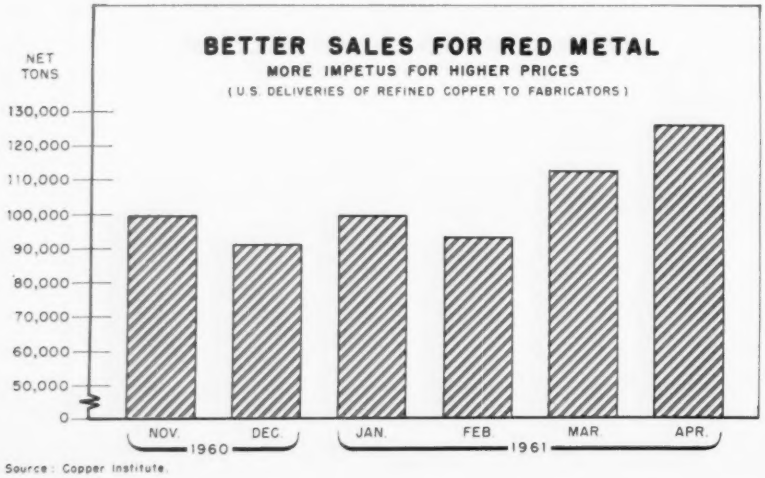
4. Labor trouble is possible in Chile in midsummer when contracts must be negotiated at two Anaconda properties.

One additional factor is important in the current copper picture. Scrap exports, mainly to Japan, have been extremely heavy. Together with the fact that collections were light during the winter because of unusually heavy snow and lower industrial activity, exports have pushed up the domestic scrap price. Custom smelters, who use large amounts of scrap, have been hard pressed to compete for the material. In fact, they've virtually been out of the market.

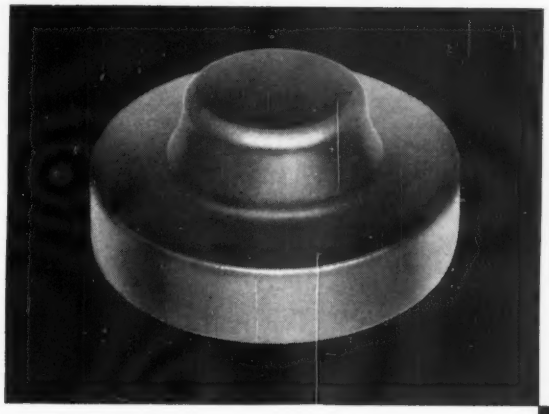
Add up the international complications, tight scrap, continued good demand overseas, plus an improved market here, and you have the factors responsible for the bull market.

• **Future**—We're probably in for a period of more advances before the market levels off. One indication: The exchange prices. As STEEL went to press last week, the London Metal Exchange price (c.i.f., duty paid in New York) was around 32.5 cents a pound; the commodity exchange was about 31.5 cents for May delivery.

It may be that once again we'll have a dual copper price (with the custom smelter quotation being the higher). But there will be no shortage or a runaway price. Reason: There's still an excess of copper. Both domestic and foreign users have been buying over immediate needs, production can be stepped up if demand warrants it. Only Kennecott among the major U. S. producers is operating at full capacity. If Free World production is maintained just as the present rate and if new mines come in as expected, the Free World will turn out 100,000 tons more copper than is consumed this year (barring major disruptions). Producers themselves don't want runaway prices.



Source: Copper Institute.



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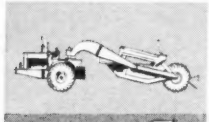

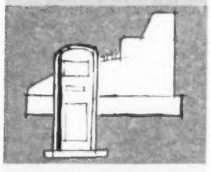

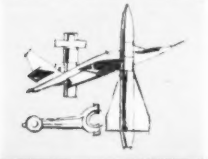

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PRIMARY METALS AND ALLOYS

Aluminum: 99.5%, 50 lb ingots, 26.00, 30,000 lb or more, f.o.b. customer custody.

Aluminum Alloy: No. 13, 25.90;No. 43, 26.20; No. 195, 27.60; No. 214, 29.00; No. 356, 26.80, 50 lb ingots.

Antimony: R.M.M. brand, 95.5%, 32.50; Lone Star brand, 33.00, f.o.b. Laredo, Tex., in bulk. Foreign brands, 99.5%, 30.50-31.00, New York, duty paid, 10,000 lb or more.

Beryllium: 97% lump or beads, $70.00 per lb, f.o.b. Cleveland or Reading, Pa.

Beryllium Aluminum: 5% Be, $65 per lb of contained Be, with balance as Al at market price, f.o.b. shipping point.

Beryllium Copper: 3.75-4.75% Be, $43 per lb of contained Be, with balance as Cu at market price on shipment date, f.o.b. shipping point.

Bismuth: $2.25 per lb, ton lots.

Cadmium: Sticks and bars, $1.70 per lb deld.

Cobalt: 99+%, $1.50 per lb for 500-lb keg; $1.52 per lb for 100 lb case; $1.57 per lb under 100 lb.

Columbium: Powder, $55 per lb and up nom.

Copper: Electrolytic, 30.00-31.00 deld.; custom smelters, nom.; lake, 30.00-31.00 deld.; fire refined, 29.75-30.75 deld.

Germanium: First reduction, ingots, less than 1 kg, 36.00-37.50 per gram; 1-10 kg, 30.50-32.00 per gram; 10 kg or more, 28.10-29.99 per gram; intrinsic grade, under 10 kg, 31.95 per gram; 10 kg or more, 29.95 per gram.

Gold: U. S. Treasury, $35 per oz.

Indium: 99.9%, $2.25 per troy oz.

Iridium: $70-75 per troy oz nom.

Lead: Common, 10.80; chemical, 10.90; corroding, 10.90; St. Louis, New York basis, add 0.20.

Lithium: 1 lb or 2 lb ingots, less than 24 lb, $11 per lb deld.; 24-90 lb, $9.50; 100-499 lb, $9.25; 450 lb or more, $9 per lb, delivered.

Magnesium: Pig, 35.25; ingot, 36.00 f.o.b. Velasco, Tex., 1.3 in. diam. x 12 in. sticks, 57.00 f.o.b. Madison, Ill.

Magnesium Alloy: AZ91A (diecasting), 40.75; AZ63A, AZ92A, AZ91C (sand casting), 40.75 f.o.b. Velasco, Tex.

Mercury: Open market, spot, New York, $203-205 per 76 lb flask.

Molybdenum: Unalloyed forging billets, 4.125-8.5 in. diam., 50-4999 lb, $8.15 per lb, depending on quantity; 5000 lb or more, $8 per lb. f.o.b. Coldwater, Mich.

Nickel: Electrolytic cathodes, briquettes, sheets (4 x 4 in. and larger), unpacked, 74.00; 10-lb pigs, unpacked, 78.25; "XX" nickel shot, 79.50; "F" nickel shot for addition to cast iron, in kegs, 74.50; "F" nickel, 5 lb ingots, 75.50. Prices f.o.b. Port Colborne, Ont., including import duty. New York basis, add 1.01; Exton, Pa., basis, add 1.60. Nickel oxide sinter at Buffalo, New York, or other established U. S. ports of entry, contained nickel 69.60.

Osmium: $70-90 per troy oz nom.

Palladium: $24-26 per troy oz.

Platinum: $82-85 per troy oz from refineries.

Radium: $16-21.50 per mg radium content, depending on quantity.

Rhodium: $137-140 per troy oz.

Ruthenium: $55-60 per troy oz.

Selenium: $6.50-7 per lb, commercial grade.

Silver: Open market, 91.375 per troy oz.

Sodium: Solid pack, c.l., 19.50; l.c.l., 20.00; 5 and 12 lb bricks, c.l., 21.00; l.c.l., 21.50; tank car, 17.00.

Tantalum: Melting stock, $35 per lb; rod, $60 per lb nom; sheet, $55 per lb nom.

Tellurium: $5.25 per lb, 100 lb or more.

Thallium: $7.50 per lb.

Tin: Straits, N. Y., spot and prompt, 111.25.

Titanium: Sponge, 99.3+% grade A-1, ductile (0.3% Fe max.), $1.60 per lb; grade A-2 0.5% Fe max), $1.50 per lb.

Tungsten: Powder, 98.8%, carbon reduced, 100-lb lots, $2.90 per lb nom., f.o.b. shipping point; less than 1000 lb, add 15.00c; 99+% hydrogen reduced, $3.10-4.00.

Zinc: Prime western, 11.50; brass special 11.75; intermediate, 12.00, East St. Louis, freight allowed over 0.50 per lb. New York basis, add 0.50. High grade, 12.35; special high grade, 12.50 deld. Die casting alloy ingot No. 3, 13.75; No. 2, 14.25; No. 5, 14.00 deld.

Zirconium: Reactor grade sponge, 100 lb or less, $8-8.50 per lb; 100-500 lb, $7.25-7.50 per lb; 500-1000 lb, $6.50-7.25; over 1000 lb, $6.50 per lb.

(Note: Chromium, manganese, and silicon metals are listed in ferroalloy section.)

SECONDARY METALS AND ALLOYS

Aluminum Ingot: Piston alloys, 24.25-26.00; No. 12 foundry alloy (No. 2 grade), 21.75-22.25; 5% silicon alloy, 0.60 Cu max, 23.50-24.00; 13 alloy, 0.60 Cu max., 23.50-24.00; 195 alloy, 24.75-25.75; 108 alloy, 22.25-22.75. Steel deoxidizing grades, notch bars, granulated or shot: Grade 1, 23.25; grade 2, 22.00; grade 3, 21.00; grade 4, 20.00.

Brass Ingot: Red brass, No. 115, 31.75; tin bronze, No. 225, 41.25; No. 245, 35.75; high leaded tin bronze, No. 305, 36.00; No. 1 yellow, No. 405, 31.25; manganese bronze No. 421, 30.50.

Magnesium Alloy Ingot: AZ63A, 37.50; AZ91B, 37.25; AZ91C, 41.25; AZ92A, 37.50.

NONFERROUS PRODUCTS

BERYLLIUM COPPER

(Base prices per lb, plus mill extras, 2000 to 5000 lb; nom. 1.9% Be alloy.) Strip, $1.955, f.o.b. Temple, Pa., or Reading, Pa.; rod, bar, wire, $1.955, f.o.b. Temple, Pa.

COPPER WIRE

Bare, soft, f.o.b. eastern mills, 20,000-lb lots, 36.35; l.c.l., 36.98. Weatherproof, 20,000-lb lots, 37.30; l.c.l., 38.05.

LEAD

(Prices to jobbers, f.o.b. Buffalo, Cleveland, Pittsburgh.) Sheets, full rolls, 140 sq ft or more, $16.50 per cwt; pipe, full coils, $16.50 per cwt; traps and bends, list prices plus 30%.

TITANIUM

(Prices per lb, 10,000 lb and over, f.o.b. mill.) Sheet and strip, $6.75-15.50; sheared mill plate, $5.25-9.00; wire, $5.55-9.50; forging billets, $3.20-4.75; hot-rolled and forged bars, $3.80-6.25.

ZINC

(Prices per lb, c.l., f.o.b. mill.) Sheets, 28.00; ribbon zinc in coils, 22.50; plates, 21.50.

ZIRCONIUM

Plate, $14.00-25.00; H.R. strip, $14.00-22.90; C.R. strip, $16.00-35.00; forged or H.R. bars, $11.00-17.40.

NICKEL, MONEL, INCONEL

	"A" Nickel	Monel	Inconel
Sheets, C.R.	138	120	138
Strip, C.R.	124	108	138
Plate, H.R.	130	110	126
Rod, Shapes, H.R.	107	89	109
Seamless Tubes	157	129	200

ALUMINUM

(Selected products and sizes)

Flat Sheets: 1100, 3003, and 5005, mill finish, 30,000 lb base f.o.b. customer custody.

Thickness Range (in.)	Width (in.)	Length Range (in.)	Price Range
0.250-0.136	24-72	72-180	45.40-48.00
0.136-0.096	24-72	72-180	45.90-48.80
0.096-0.077	24-72	72-180	46.40-50.30
0.077-0.068	24-72	72-180	46.90-52.10
0.068-0.061	24-72	72-180	46.90-55.00
0.061-0.048	24-72	72-180	47.40-57.70
0.048-0.038	24-72	72-180	47.90-60.50
0.038-0.030	24-72	72-180	48.40-65.30
0.030-0.024	24-72	72-180	48.90-67.20
0.024-0.019	24-60	72-180	49.40-59.90
0.019-0.017	24-48	72-144	50.30-57.00
0.017-0.015	24-48	72-144	51.20-58.00
0.015-0.014	24-36	72-144	52.30
0.014-0.012	24-36	72-144	53.50
0.012-0.011	24-36	72-114	54.60
0.011-0.0095	24-46	72-144	56.20
0.0095-0.0085	24-36	72-96	57.50
0.0085-0.0075	24-36	72-96	59.20
0.0075-0.007	24-36	72-96	60.80
0.007-0.006	24-36	72-96	62.50

ALUMINUM (continued)

Plates and Circles: Thickness, 0.25-3 in.; width or diam., 24-60 in.; length, 72-240 in., mill finish.

Alloy	Plate Base	Circle Base
1100, 3003-F	44.60	50.90
5050-F	45.70	50.50
3004-F	46.70	52.40
5052-F	47.30	53.10
6061-T6	47.80	53.90
2024-T4*	51.80	58.90
7075-T6*	60.50	67.90

*24-48 in. width or diam., 72-180 in. lengths.

Screw Machine Stock: 30,000 base, 12 ft lengths.

Diam	Round		Hexagonal	
(in.)*	2011-T3	2017-T4	2011-T3	2017-T4
0.125	74.90	77.30	....	....
0.188	63.20	63.20	....	80.10
0.250	60.00	62.60	72.70	74.10
0.375	59.20	63.80	71.00	72.00
	2011-T3	2017-T451	2011-T3	2017-T451
0.500	59.20	63.80	71.00	72.00
0.625	59.20	63.80	67.80	67.90
0.750	57.70	62.00	61.60	63.80
0.875	57.70	62.00	61.60	63.80
1.000	57.70	62.00	61.60	63.80
1.125	55.30	59.50	59.50	61.50
1.250	55.30	59.50	59.50	61.50
1.375	55.30	59.50	59.50	61.50
1.500	55.30	59.50	59.50	61.50
1.625	53.00	56.70	....	59.30
1.750	53.00	56.70	58.30	59.30
1.875	53.00	56.70	....	59.30
2.000	53.00	56.70	58.30	59.30
2.250	51.50	55.00	....	59.30
2.500	51.50	55.00	....	59.30
2.750	49.90	53.20	....	59.30
3.000	49.00	53.20	....	59.30
3.250	....	53.20	....	....
3.375	....	53.20	....	....

*Selected sizes.

Forging Stock: Round, Class 1, random length, diam., 0.375-8 in., "F" temper; 2014, 47.50-57.60; 6061, 43.50-57.60; 7075, 61.80-71.90; 7079, 66.80-76.90.

Pipe: ASA schedule 40, alloy 6063-T6, 3-40 ft lengths, plain ends, 90,000 lb base, dollars per ft. Nominal pipe sizes: 1 in., 32.00; 1¼ in., 43.40; 1½ in., 51.80; 2 in., 62.60; 3 in., 124.95; 4 in., 171.80; 5 in., 233.15; 6 in., 308.55; 8 in., 464.35; 10 in., 716.25 (3-24 ft lengths).

Factor	Alloy 6063-T5	Alloy 6062-T6
1-14	45.30-46.80	54.00-60.00
15-17	45.30-46.80	56.50-61.80
18-23	45.80-47.50	58.60-67.60
24-32	45.80-47.50	66.80-81.50
33-38	49.50-52.20	85.10-96.60
39-44	59.80-63.60	102.00-124.00

MAGNESIUM

Sheets and Plates: AZ31B standard grades, .032 in., 103.10; .081 in., 77.90; .125 in., 70.40; .188 in., 69.00; .250-2.00 in., 67.90. AZ31B spec. grades, .032 in., 171.30; .081 in., 108.80; .125 in., 98.10; .188 in., 95.70; .250-2.00 in., 93.30. Tread plate, 60-192 in. lengths, 24-72 in. widths; .125 in., 74.90; .188 in., 71.70-72.70; .25-.75 in., 70.60-71.60. Tooling plate, 0.25-3.00 in., 73.00.

Extruded Solid Shapes:

Factor	Com. Grade (AZ31C)	Spec. Grades (AZ31B)
6-8	65.30-67.60	84.60-87.40
12-14	65.30-67.60	85.70-88.00
24-26	66.10-68.40	90.60-91.30
36-38	71.50-75.30	104.20-105.30

NONFERROUS SCRAP

DEALERS' BUYING PRICES

Copper and Brass: No. 1 heavy copper and wire, 23.50-24.00; No. 2 heavy copper and wire, 22.25-22.75; light copper, 19.75-20.25; No. 1 composition red brass, 21.00-21.50; No. 1

BRASS MILL PRICES

	MILL PRODUCTS a				SCRAP ALLOWANCES d (Based on copper at 31.00c)		
	Sheet, Strip, Plate	Rod	Wire	Seamless Tubes	Clean Heavy	Rod Ends	Clean Turnings
Copper	56.13b	50.61-51.36	....	57.32	27.00	27.00	26.25
Yellow Brass	49.27	34.77c	49.56	53.43	20.375	19.50c	18.50c
Low Brass, 80%	52.15	52.09	52.44	56.21	22.875	22.625	22.125
Red Brass, 85%	53.17	53.11	53.46	57.23	23.875	23.625	23.125
Com. Bronze, 90%	54.73	54.67	55.02	58.54	24.75	24.50	24.00
Manganese Bronze	57.71	51.27	61.54	....	19.25	19.00	18.25
Muntz Metal	51.94	47.25	....	....	19.125	18.875	18.375
Naval Brass	53.94	47.75	60.25	58.10	19.00	18.75	18.25
Silicon Bronze	61.39	60.58	60.68	79.80	26.375	26.125	25.375
Nickel Silver, 10%	64.83	67.16	66.91	....	25.25	25.00	12.625
Phos. Bronze, A-5%	76.97	77.47	76.72	78.90	28.50	28.25	27.25

a. Cents per lb, f.o.b. mill; freight allowed on 50 lb or more. b. Hot-rolled. c. Free cutting d. Prices in cents per lb for less than 20,000 lb, f.o.b. shipping point. On lots over 20,000 lb at one time of any or all kinds of scrap, add 1 cent per lb.

composition turnings, 20.00-20.50; new brass clippings, 17.50-18.00; light brass, 14.50-15.00; heavy yellow brass, 15.50-16.00; new brass rod ends, 16.50-17.00; auto radiators, unsweated, 15.75-16.25; cocks and faucets, 17.50-18.00; brass pipe, 18.00-18.50.

Lead: Soft scrap lead, 7.25-7.75; battery plates, 3.00-3.25; linotype and stereotype, 8.50-8.75; electrotype, 8.00-8.25; mixed babbitt, 9.50-10.00.

Monel: Clippings, 23.00-23.50; old sheets, 22.00-23.00; turnings, 16.50-17.00; rods, 22.00-23.00.

Nickel: Sheets and clips, 52.00-54.00; rolled anodes, 52.00-54.00; turnings, 40.00; rod ends, 52.00-54.00.

Zinc: Old zinc, 3.50-4.00; new diecast scrap, 3.50-4.00; old diecast scrap, 1.75-2.00.

Aluminum: Old castings and sheets, 9.75-10.25; clean borings and turnings, 4.50-5.00; segregated low copper clips, 11.75-12.25; segregated high copper clips, 10.75-11.25; mixed low copper clips, 11.25-11.75; mixed high copper clips, 10.75-11.25.

(Cents per pound, Chicago)

Aluminum: Old castings and sheets, 9.75-10.25; clean borings and turnings, 7.00-7.50; segregated low copper clips, 15.00-15.50; segregated high copper clips, 13.00-13.50; mixed low copper clips, 12.50-13.00; mixed high copper clips, 12.00-12.50.

(Cents per pound, Cleveland)

Aluminum: Old castings and sheets, 11.00; clean borings and turnings, 9.00-9.50; segregated low copper clips, 14.00; segregated high copper clips, 13.50; mixed low copper clips, 13.50; mixed high copper clips, 13.00-13.50.

REFINER'S BUYING PRICES

(Cents per pound, carlots, delivered refinery)
Beryllium Copper: Heavy scrap, 0.020-in. and heavier, not less than 1.5% Be, 57.00; light scrap, 52.00; turnings and borings, 37.00.

Copper and Brass: No. 1 heavy copper and wire, 28.50; No. 2 heavy copper and wire, 26.25; light copper, 24.00; refinery brass (60% copper) dry copper content, 25.00.

INGOTMAKERS' BUYING PRICES

Copper and Brass: No. 1 heavy copper and wire, 28.50; No. 2 heavy copper and wire, 26.50; light copper, 24.25; No. 1 composition borings, 23.00-23.50; No. 1 composition solids, 23.50-24.00; heavy yellow brass solids, 18.00; yellow brass turnings, 16.50-17.00; radiators, 18.50.

Plating Material

(F.o.b. shipping point, freight allowed on quantities)

ANODES

Cadmium: Special or patented shapes, $1.60.

Copper: Flat-rolled, 47.54; oval, 44.00; electrodeposited, 39.50; cast, 42.00; 5000-10,000 lb quantities.

Nickel: Depolarized, less than 500 lb, 109.00; 500-1999 lb, 102.00; 2000-4999 lb, 98.50; 5000-29,999 lb, 97.50; 30,000 lb, 96.50. Carbonized, deduct 3 cents a lb.

Tin: Bar or slab, less than 200 lb, 129.50; 200-499 lb, 128.00; 500-999 lb, 127.50; 1000 lb or more, 127.00.

Zinc: Balls, 18.25; flat tops, 18.25; flats 21.00; ovals, 20.25, ton lots.

CHEMICALS

Cadmium Oxide: $1.60 per lb in 100-lb drums.

Chromic Acid (flake): 100-2000 lb, 31.00; 2000-10,000 lb, 30.50; 10,000-20,000 lb, 30.00; 20,000 lb or more, 29.50.

Copper Cyanide: 100-200 lb, 65.90; 300-900 lb, 63.00; 1000-19,000 lb, 61.90.

Copper Sulphate: 100-1900 lb, 15.00; 2000-5900 lb, 13.00; 6000-11,900 lb, 12.75; 12,000-22,900 lb, 12.50; 23,000 lb or more, 12.00.

Nickel-Chloride: 100 lb, 45.00; 200 lb, 43.00; 300 lb, 42.00; 400-4900 lb, 40.00; 500-9900 lb, 38.00; 10,000 lb or more, 37.00.

Nickel Sulphate: 5000-22,999 lb, 29.00; 23,000-39,900 lb, 28.50; 40,000 lb or more, 28.00.

Sodium Cyanide (Cyanobrik): 2000 lb, 23.80; 400-900 lb, 20.80; 1000-4900 lb, 19.80; 5000-19,900 lb, 18.80; 20,000 lb or more, 17.60.

Sodium Stannate: Less than 100 lb, 84.20; 100-600 lb, 74.50; 700-1900 lb, 71.80; 2000-9900 lb, 69.90; 10,000 lb or more, 68.20.

Stannous Chloride (Anhydrous): 25 lb, 175.00; 100 lb, 141.70; 400 lb, 131.70; 800-19,900 lb, 110.40; 20,000 lb or more, 106.20.

Stannous Sulphate: Less than 50 lb, 144.40; 50 lb, 119.40; 100-1900 lb, 117.40; 2000 lb or more, 115.40.

Zinc Cyanide: 100-200 lb, 59.00; 300-900 lb, 57.00.

(*Concluded from Page 177*)

the nation is centered in this area where export business is a strong factor. Supplies of scrap are not too plentiful and shippers are scouring the interior for supplies.

Domestic mills are buying in fair volume.

The Alaska Division of Supply has called bids at Juneau, May 31, for the sale of 67,659 ft (about 700 tons) of used rail and 2862 fishplates on the Copper River railway and highway.

• **Tacoma, Wash.** — Recent price weakness that was reported east of the Rockies has not spread to the Pacific Coast. Exporters are scouring the area for suitable tonnages. Two full cargoes (8000 and 9500 tons) are scheduled for export to Japan in the next month. Exporters expect a steady and active market to extend into the third quarter.

Magnesium Tooling Plate Thickness Tolerances Set

New guaranteed thickness tolerances and typical mechanical properties for magnesium tooling plate are announced by Dow Metal Products Co., a division of Dow Chemical Co., Midland, Mich. The new tolerances, which apply to plate-to-plate thickness, have been improved by as much as 0.023 in. for thicknesses under 1¼ in. and by as much as 0.040 in. for thicknesses over 1¼ in. The typical mechanical properties for magnesium tooling plate have been improved by listing specific values rather than broad ranges. Magnesium tooling plate is used in jigs, fixtures, templates, and certain types of dies.

Japanese Steel Exports Decline from 1960 Pace

Japanese exports of finished steel products to the U. S. in April dropped 27.1 per cent from the year ago level, reports the Japanese Ministry of International Trade & Industry.

The Ministry says exports of all kinds to the U. S. totaled $73.91 million in April, down 24.3 per cent from April, 1960, and off 13.3 per cent from March, this year.

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Machinery and Equipment Wanted

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For forming metal ribbed roofing sheets, to accommodate 36" sheet minimum width. Quote giving make, number of stations, spindles diameter, girth opening, roll pitch vertical adjustment and all details and specifications. No tooling required.

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We have supervisory positions open in our Maintenance Departments for engineers with a college degree and 5 to 8 years steel mill experience. Excellent opportunities for advancement. Send complete resume, including salary requirements to:

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For Midwest manufacturer of production fusion welding machines. Must have experience in mass production techniques and automatic welding process applications. Ability to visualize methods of process mechanization, and to prepare quotations, specifications, and negotiations with customer through sales representatives is required. Age 30-35. Only applicants possessing these qualifications will be considered.

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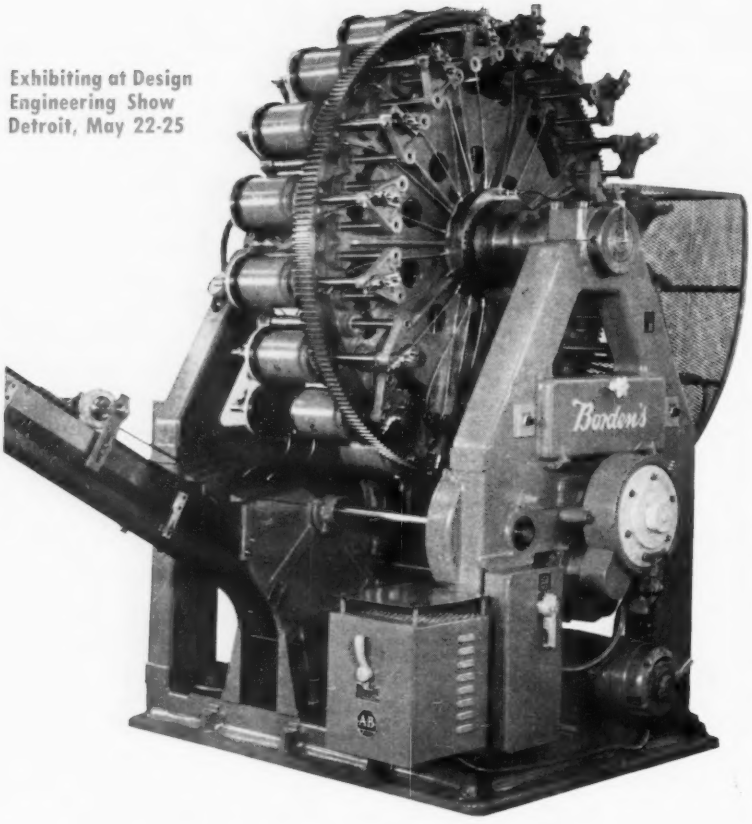

MAJOR SOURCE

A CASE IN POINT—The new Borden 18 pocket 4 and 5 quart Can Tester is the first pneumatic tester of this type in the world. Fast, automatic, reliable; it depends on sound, wear-resistant castings for dimensional accuracy and stability. Hamilton Foundry supplies 127 castings ranging from 2 pounds to 1300 pounds for this machine. Borden also makes a 9 pocket Tester for cans up to 2½ gallon capacity. In fact, most of the iron castings used in these machines come from Hamilton Foundry, a reliable single source for engineered castings.

When new and unusual design problems arise in selecting metal and casting parts, the skill and integrity of Hamilton Foundry is your best insurance that specifications—and delivery schedules—will be met.

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Advertising Index

Accurate Perforating Co. 174
Acme-Newport Steel Co. 154
Aetna-Standard Division, Blaw-Knox Co. 142
Air Reduction Sales Co., A Division of Air Reduction Co., Inc. 56, 57
Ajax Magnethermic Corporation 3
Alan Wood Steel Co. 36
Allen-Bradley Co. 65, 66
Allied Oil Co., Division of Ashland Oil & Refining Co. 127
Allmetal Screw Products Co., Inc. 95
Aluminium Limited Sales, Inc. 82
Aluminum Company of America 25, 26
American Brake Shoe Co., Denison Engineering Division 31
American Nickeloid Co. 35
American Oil Co. 104, 105
American Optical Co. 42
American Sealants Co. 11
Anaconda Wire & Cable Co. 175
Armco Steel Corporation, Union Wire Rope .. 64
Ashland Oil & Refining Co., Allied Oil Co. Division 127
Associated Spring Corporation 44

Babcock & Wilcox Co., The, Refractories Division 145
Babcock & Wilcox Co., The, Tubular Products Division ..... Inside Front Cover
Barnes, Wallace, Co., Ltd. 44
Barnes, Wallace, Division, Associated Spring Corporation 44
Barnes, Wallace, Steel Division, Associated Spring Corporation 44
Bethlehem Steel Co. 1
B-G-R Division, Associated Spring Corporation 44
Blaw-Knox Co., Aetna-Standard Division 142
Bliss & Laughlin 109
Buffalo Forge Co. 34

Carborundum Co. 67
Carpenter Steel Co., The 59
Cincinnati Milling Machine Co., The, Cincinnati Milling Products Division 114
Cincinnati Shaper Co., The 29
Clark Controller Co., The 37
Cleveland Crane & Engineering Co., The, Steelweld Machinery Division 38
Colorado Fuel and Iron Corporation, The 152, 153
Columbia-Geneva Steel Division, United States Steel Corporation 70, 71, 147, 156
Commercial Shearing & Stamping Co. 8, 9
Cone-Drive Gears Division, Michigan Tool Co. 106
Continental Steel Corporation 107
Copperweld Steel Co., Superior Steel Division 91
Cutler-Hammer, Inc. 112, 113

Deming Co., The 174
Dempster Brothers 163
Denison Engineering Division, American Brake Shoe Co. 31
De Vilbiss Co., The 125
DoAll Co., The 142
Drever Co. 123
Dunbar Brothers Division, Associated Spring Corporation 44

Eaton Manufacturing Co., Reliance Division 161
Electric Controller & Mfg. Division, Square D Co. 138, 139
Electric Furnace Co., The 101
Enamel Products & Plating Co. 55

Falk Corporation, The 60
Fate-Root-Heath Co., The 148
Fenn Manufacturing Co., The 58

General Electric Co. 102, 103
General Motors Corporation, Hyatt Bearings Division 88
General Steel Castings, Inc., National Roll & Foundry Division 54
Gibson Division, Associated Spring Corporation 44
Gisholt Machine Co. 61
Goodyear Tire & Rubber Co., Inc., The Industrial Products Division 12, 13

Hamilton Foundry, Inc. 184
Hill Acme Co., The 160
Heresite & Chemical Co. 166
Hooker Chemical Corporation 30
Horsburgh & Scott Co., The 108
Houghton, E. F., & Co. 48
Hyatt Bearings Division, General Motors Corporation 88

Jones & Laughlin Steel Warehouse Division 43

Kaiser Aluminum & Chemical Sales, Inc., Kaiser Refractories & Chemicals Division .. 39
Kaiser Steel Corporation 183
Kentucky, Commonwealth of, Department of Economic Development 68
Keokuk Electro-Metals Co., Division of Vanadium Corporation of America 159
Keystone Steel & Wire Co. 149

Landis Tool Co. 2
Lindberg Engineering Co. 130
Link-Belt Co. 28
Luria Brothers & Co., Inc. 179

Manning, Maxwell & Moore, Inc., Shaw-Box Crane & Hoist Division 158
Manross, F. N., & Sons Division, Associated Spring Corporation 44
Mesta Machine Co. .... Back Cover
Michigan Tool Co., Cone-Drive Gears Division 106
Midland-Ross Corporation, Surface Combustion Division 27
Midwest Steel Division of National Steel Corporation 111
Milwaukee Division, Associated Spring Corporation 44
Milwaukee Foundry Equipment Division, SPO, Inc. 176
Mobil Oil Co. 22, 23
Morgan Construction Co. 81, 129
Mundt, Charles, & Sons 185

National Roll & Foundry Division, General Steel Industries, Inc. 54
National Steel Corporation 111
National Tube Division, United States Steel Corporation 70, 71
New Britain Machine Co., The, New Britain-Gridley Machine Division 45, 46
New Jersey Zinc Co., The 150, 151
Norton Co. 50, 51

Ohio Division, Associated Spring Corporation 44
Ohio Steel Foundry Co., The 96
Osborn Manufacturing Co., The 110

Pacific Industrial Mfg. Co. 32
Pacific Press & Shear Corporation 32
Pangborn Corporation 162
Parker Rust Proof Co. 40
Production Machinery Corporation 7

Raymond Manufacturing Division, Associated Spring Corporation 44
Reliance Division, Eaton Manufacturing Co. . 161
Republic Steel Corporation 14, 15

St. Joseph Lead Co. 62
Seaboard Pacific Division, Associated Spring Corporation 44
Seaway Steel Corporation 16
Shaw-Box Crane & Hoist Division, Manning, Maxwell & Moore, Inc. 158
Shell Oil Co. 87
Shepard Niles Crane & Hoist Corporation 136
Signode Steel Strapping Co. 92
Simonds Gear & Mfg. Co., The 94
Simoniz Industrial Products, A Division of Simoniz Co. 52
SPO, Inc., Milwaukee Foundry Equipment Division 176
Square D Co., Electric Controller & Mfg. Division 138, 139
Superior Steel Division of Copperweld Steel Co. 91
Surface Combustion, A Division of Midland-Ross Corporation 27
Swindell-Dressler Corporation 99

Taft-Peirce Manufacturing Co. 10
Tennessee Coal & Iron Division, United States Steel Corporation 147, 156
Texaco, Inc. 63
Thompson Wire Co. 131
Tinnerman Products, Inc. 33
Torrington Co., The 21
Transue & Williams 181
Tubular Rivet & Stud Co. 132

Union Wire Rope, Armco Steel Corporation .. 64
United-Greenfield Corporation, J. H. Williams & Co. Division 41
United States Steel Corporation, Subsidiaries 70, 71, 147, 156
United States Steel Export Co. ..70, 71, 147, 156
United States Steel Supply Division, United States Steel Corporation 70, 71, 147
Universal Cyclops Steel Corporation 49

Valley Mould & Iron Corporation 72
Vanadium Corporation of America 47
Vanadium Corporation of America, Keokuk Electro-Metals Co. Division 159

Warner & Swasey Co., The 4
Weirton Steel Division of National Steel Corporation 111
Westinghouse Electric Corporation, Sturtevant Division 53
Wheland Co., The 6
Williams, J. H., & Co., Division of United-Greenfield Corporation 41
Wilson, Lee, Engineering Co., Inc. .... Inside Back Cover

Yawata Iron & Steel Co., Ltd. 186

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Table of Contents, Page 19

Classified Advertising, Page 183

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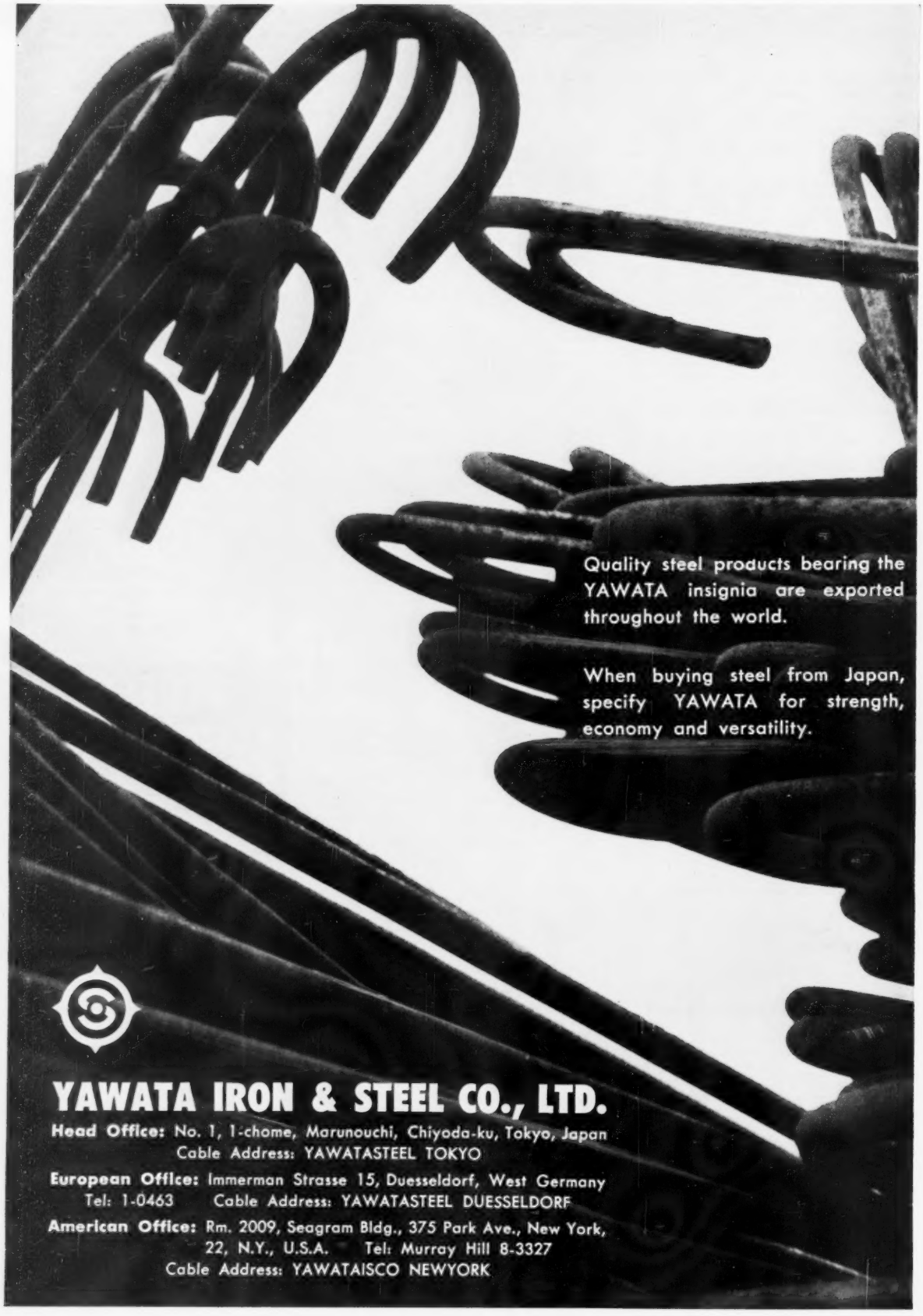
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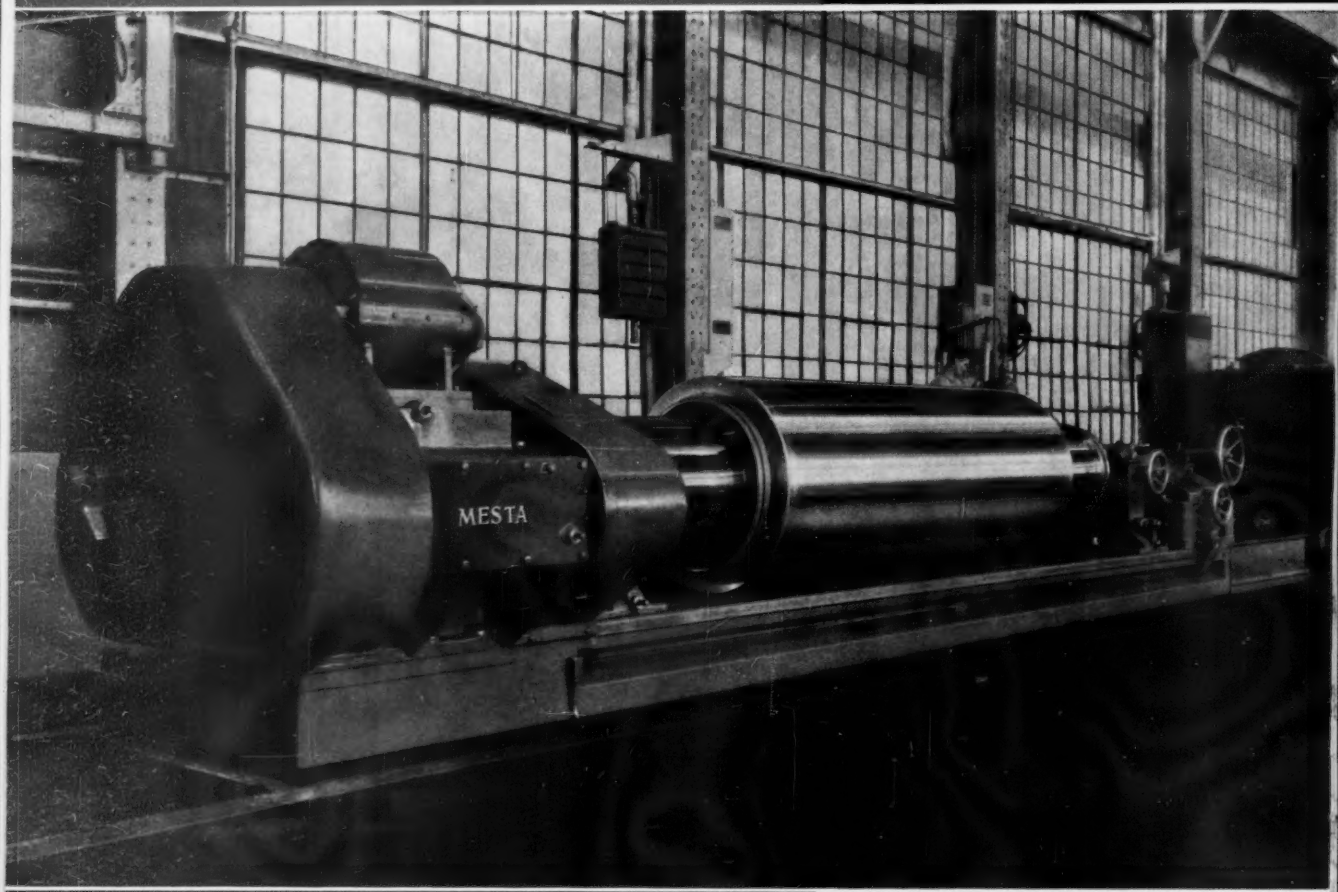

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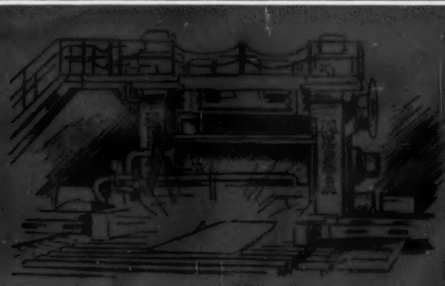

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